CONTRACT DOCUMENTS, GENERAL CONDITIONS, AND SPECIAL PROVISION SPECIFICATIONS

KACKMAN CREEK CULVERT REPLACEMENT WITH A NEW 110-FOOT BRIDGE AT 55TH AVE NE

Stillaguamish Tribe of Indians

STILLAGUAMISH

stuləgʷaʼbš

VILLAGE

February 7, 2020

Prepared by:

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Note:
Some pages in this document have been purposely skipped or blank pages inserted so that this document will copy correctly when duplexed.

KACKMAN CREEK CULVERT REPLACEMENT PROJECT

CONTRACT DOCUMENTS

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CONTRACT DOCUMENTS, GENERAL CONDITIONS, AND SPECIAL PROVISION SPECIFICATIONS

KACKMAN CREEK CULVERT REPLACEMENT PROJECT

SECTION I - INVITATION TO BID

The Stillaguamish Tribe of Indians will receive Project Proposal SEALED BIDS at the Tribal Administration Building reception desk (location of official time clock) located at 3322 236th St NE Arlington, WA 98223 until 2:00 p.m. on Thursday, March 5, 2020; and then and there will open and publicly read the bids for the construction of the:

KACKMAN CREEK CULVERT REPLACEMENT WITH A
NEW 110-FOOT BRIDGE AT 55TH AVE NE

All Project Proposals shall be secured with a bid deposit by certified check, cashier's check, or surety bond in an amount equal to five percent (5%) of the sum total amount of all bid item total prices.

The right is reserved by the Stillaguamish Tribe of Indians to reject any and all Project Proposals and to waiver informalities in the bidding. The Stillaguamish Tribe of Indians will not issue a waiver of sovereign immunity for this project.

Plans, specifications, addenda, and plan holders list for this project will be available on-line through Builders Exchange of Washington, Inc. at http://www.bxwa.com.

The improvement(s) for which Project Proposals will be received is described below:

> This project will replace the 48-inch-diameter, corrugated metal culvert that conveys Kackman Creek under 55th Ave NE approximately 3 miles northwest of Arlington, in Snohomish County, Washington. The roadway embankment is sloughing into the creek, the culvert is at the end of its service life, and in combination with a series of failing log weirs downstream, the culvert has become a barrier to fish passage.
>
> The culvert will be replaced with a 110-foot single span bridge, and accompanying soldier pile retaining walls. There will be approximately 472 linear feet of roadway improvements along 55th Ave NE, with the roadway being widened from 22-feet wide at the northern and southern project limits to 30-feet approaching the bridge. The bridge abutments will be constructed of 24-inch diameter, concrete-filled, steel pipe piles, and the abutment wall alignments will have an approximate 30-degree skew. Approximately 250-feet of the Kackman Creek channel will be regraded and restored as a roughened channel to tie in to existing channel grades upstream and downstream of the project reach. Bank stability and in-channel physical habitat will be provided by log structures and coir soil lift installation to support long-term vegetation establishment. All disturbed vegetated areas and ground surfaces (e.g., stream banks, access and staging areas) will be restored to similar or improved conditions through a combination of seeding, mulching, and planting with native plant species. Approximately 980 square feet of riverine wetland will be created within the stream channel and approximately 0.32 acres of

riparian buffer will be enhanced along Stillaguamish Tribal land approximately 75 feet west of the project area.
The entire project will be constructed within the Snohomish County right of way and land owned by the Stillaguamish Tribe of Indians.

The following is applicable to this project:

The Stillaguamish Tribe of Indians in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat.252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, subtitle A, Office of the Secretary, Part 21, nondiscrimination in federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color or national origin in consideration of an award.

There will be a mandatory Pre-Bid Site Meeting that will be held in the parking lot of the Tribal Community Center at 24410 55th Ave NE, Arlington, WA 98223 with a walk to the project site on Wednesday, February 19, 2020 convening at 11:00 a.m. To participate in this meeting, please send an email request to ckirk@stillaguamish.com and you will receive detailed meeting information. The Tribal Project Manager and the Engineer will be present to discuss the project.

INSTRUCTION TO BIDDERS

BIDDER'S RESPONSIBILITY STATEMENT

1. LOW RESPONSIBLE BIDDER
2. SUBCONTRACTOR RESPONSIBILITY
3. WORK HOURS AND SPECIAL TIME LIMITATIONS
4. COMPLETION TIME
5. PRE-BID CONTACT
6. INSURANCE REQUIREMENTS
7. PERMITS
8. AWARD
9. SUPPLEMENTAL RESPONSIBLE BIDDER CRITERIA
10. BID SUBMISSION

    I BID FORMS

    II BIDDER'S QUALIFICATION CERTIFICATE

    III SUBCONTRACTORS LIST

    IV BID PROPOSAL BOND FORM

    V NON-COLLUSION DECLARATION

    VI CERTIFICATION FOR STILLAGUAMISH CONTRACTS

    VII DEBARMENT, SUSPENSION, INELIGIBILITY OR VOLUNTARY EXCLUSION CERTIFICATE FORM

    VIII IRS FORM W-9 REQUEST FOR TAXPAYER IDENTIFICATION NUMBER AND CERTIFICATION

    IX PROJECT PROPOSAL SIGNATURE PAGE

BIDDER'S RESPONSIBILITY STATEMENT

It is the responsibility of each bidder to ascertain if all the documents listed on the index are included in their copy of the bid specifications.

If documents are missing, it is the sole responsibility of the bidder to contact the Stillaguamish Tribe of Indians to obtain the missing documents prior to bid opening time.

1. LOW RESPONSIBLE BIDDER:

A. It is the intent of the Owner to award a contract to the lowest responsive and responsible bidder. Before award, the bidder must meet the following bidder responsibility criteria to be considered a responsible bidder. The bidder may be required by the Owner to submit documentation demonstrating compliance with the criteria. The bidder must:

1. Provide a current certificate of registration in compliance with chapter 18.27 RCW, which must be in effect at the time of bid submittal;

2. Provide a current Washington Unified Business Identifier (UBI) number;

3. Provide proof of Industrial Insurance (worker's compensation) coverage for the bidder's employees working in Washington, as required in Title 51 RCW or provide a signed certification that such insurance is not required;

4. Provide a current Washington Employment Security Department number, as required in Title 50 RCW or provide a signed certification that such number is not required;

5. Provide a Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW or provide a signed certification that such number is not required; and

6. Disclose all cited environmental permit violations against the contractor and subcontractors within the last five (5) years, including reference numbers and contact information for the agency/municipality issuing the citation. (i.e. construction stormwater quality, water quality certifications, hydraulic permit, wetland permit enforcement actions including: "Notice of Violation," Notice on Non-Compliance," "Administrative Orders to correct a Violation," civil penalties, and criminal convictions);

7. The Bonding Company the contractor uses will be important to the Stillaguamish Tribe of Indians. This Bonding Company must be: 1) registered with the Washington State Insurance Commissioner; and 2) appear on the current Authorized Insurance List in the State of Washington as published by the Office of the Insurance Commissioner.

Name of Bonding Company	
Contractor's Bonding Limits	
Contractor's Bonding Capacity available for this job	

2. SUBCONTRACTOR RESPONSIBILITY:

A. At the time of the execution of any subcontract, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria by requiring each subcontractor to:

1. Provide a current certificate of registration in compliance with chapter 18.27 RCW, which must be in effect at the time of bid submittal;

2. Provide a current Washington Unified Business Identifier (UBI) number;

3. Provide proof of Industrial Insurance (worker's compensation) coverage for the bidder's employees working in Washington, as required in Title 51 RCW or provide a signed certification that such insurance is not required;

4. Provide a current Washington Employment Security Department number, as required in Title 50 RCW or provide a signed certification that such number is not required;

5. Provide a Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW or provide a signed certification that such number is not required; and

6. Disclose all cited environmental permit violations against the contractor and subcontractors within the last five (5) years, including reference numbers and contact information for the agency/municipality issuing the citation. (i.e. construction stormwater quality, water quality certifications, hydraulic permit, wetland permit enforcement actions including: "Notice of Violation," "Notice of Non-Compliance," "Administrative Orders to Correct a Violation," civil penalties, and criminal convictions).

B. The Contractor shall include the language of this section in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. The requirements of this section apply to all subcontractors regardless of tier.

3. WORK HOURS AND SPECIAL TIME LIMITATIONS

Working hours shall be from 7:00 a.m. to 6:00 p.m., weekdays, and in accordance with the Snohomish County Noise Ordinance.

4. COMPLETION TIME

The Contractor shall complete all project work between **March 12, 2020**, and **November 15, 2020**. **No work shall occur within the Ordinary High Water (OHW) of Kackman Creek before July 16 or after August 31** as required by the Department of the Army Nationwide Permit (NWP) 27 issued by the

U.S. Army Corps of Engineers and the Hydraulic Project Approval (HPA) permit issued by the Washington Department of Fish and Wildlife, included in the Contract Documents. A modification to the NWP 27 to extend the OHW work window to September 15, 2020 has been requested and is being reviewed. If this modification is granted, an addendum clarifying this change will be issued. **Planting of trees and shrubs shall be completed between October 1, 2020 and November 15, 2020.** The Contractor shall complete all work on the project, except for necessary plant establishment maintenance, before November 15, 2020. All equipment and materials shall be de-mobilized and cleared from the site before **November 15, 2020.** Extensions in completion time will be granted for increases in the contract value of the work to be done.

5. PRE-BID CONTACT

For information during the bidding period, please contact the Project Representative:

Carole Kirk
Stillaguamish Tribe of Indians
3322 236th St NE
PO Box 277
Arlington, WA 98223
ckirk@stillaguamish.com

6. INSURANCE REQUIREMENTS

The Contractor shall procure and maintain, for the duration of this Agreement, insurance coverage in accordance with the requirements set forth herein.

All insurance costs shall be paid for by the Contractor. Such costs shall be deemed incidental to and included in the various bid items of work and no additional compensation will be allowed.

7. PERMITS

See the Contract Specifications and Appendix E for specific permit conditions that apply to this project. In addition, the Contracting Agency is currently coordinating with Snohomish County to obtain a Title 13 Right-of-Way Use Permit as well as a Lane Closure Permit which will be issued prior to construction.

8. AWARD

The Stillaguamish Tribe of Indians (owner) will award the Contract to the lowest responsive and responsible bidder based on the lowest Total Bid Price. The Stillaguamish Tribe of Indians reserves the right to not award to the lowest responsive and responsible bidder at its sole determination for any reason.

9. SUPPLEMENTAL RESPONSIBLE BIDDER CRITERIA

I. Bidder's Prior Work Experience Constructing Stream Restoration

A. Criterion: The Bidder or its subcontractor(s) shall demonstrate that the Superintendent, Foreman, and Equipment Operator for stream restoration work have prior experience on a minimum of three projects of similar size and scope to the subject project from within the five years prior to the bid submittal date. If a subcontractor is used to meet this Criterion, the Bidder shall be responsible for retaining the subcontractor for the duration of the stream restoration construction.

B. Documentation: The Bidder or its subcontractor(s), if and when required as detailed below, shall submit a list at least three projects completed in the five years prior to the bid submittal date that have had culvert replacement of similar size and scope and include for each project the following information:

- A written description of the work elements that must include:
    - Operating equipment and installing engineered wood or log structures (with a cumulative total of at least 15 pieces of large woody debris or logs) within identified ordinary high water lines of a stream, river, or lake.
    - The installation of a temporary streamflow bypass.
    - Successful compliance with the requirements of a Hydraulic Project Approval (HPA) permit written by the Washington Department of Fish and Wildlife.
- For each of the three (3) qualifying projects, identify the following:
    - Name of the project and how it meets each of the additional requirements identified above
    - The Hydraulic Project Approval control number
    - Initial contract time (start and end dates), and final contract time (actual end dates)
    - The initial contract value
    - The final contract value
    - Name and telephone number of project owner
    - Name and telephone number of the owner's project manager or other person who can verify the Contractor's experience

The same projects may be used to meet Criteria I, II, and/or III if the project had stream restoration and culvert replacement and soldier pile wall construction of similar size and scope.

The written documentation for the supplemental responsible bidder criteria shall be submitted in a table using the format below within two (2) business days of the bid opening. If the contact person cannot be reached at the phone number provided, then that project will not be considered a valid submittal and may result in the bid being considered nonresponsive.

Superintendent

Project Name	HPA Control #	Initial/Final Contract Time	Initial/Final Contract Value	# of Logs	Bypass (Y/N)	Project Owner Name/Phone	Project Manager Name/Phone

Foreman

Project Name	HPA Control #	Initial/Final Contract Time	Initial/Final Contract Value	# of Logs	Bypass (Y/N)	Project Owner Name/Phone	Project Manager Name/Phone

Equipment Operator

Project Name	HPA Control #	Initial/Final Contract Time	Initial/Final Contract Value	# of Logs	Bypass (Y/N)	Project Owner Name/Phone	Project Manager Name/Phone

The successful bidder shall maintain at least two of the qualified employees (one of which must be the Foreman), on site while installation and removal of the temporary stream bypass and installation of the logs and large woody debris is in progress. Failure to maintain the qualified employees on site during installation and removal of the temporary stream bypass shall be grounds to issue a stop work order or terminate the contract. Such actions shall not be the basis for any claim for damages or additional compensation. In the event of termination, the bidder shall be responsible for any and all costs associated with terminating the Contract and re-advertising the project for bids

II. Bidder's Prior Work Experience Constructing Culvert Replacements

A. Criterion: The Bidder or its subcontractor(s) shall have prior experience on a minimum of three projects of similar size and scope to the subject project from within the five years prior to the bid submittal date. If a subcontractor is used to meet this Criterion, the Bidder shall be responsible for retaining the subcontractor for the duration of the culvert replacement construction.

B. Documentation: The Bidder or its subcontractor(s), if and when required as detailed below, shall submit a list at least three public works projects completed in the five years prior to the bid submittal date that have had culvert replacement of similar size and scope and include for each project the following information:

- Name of project
- The owner and contact information for the owner;

- A written description of the project scope or portions of the project scope as they relate to culvert replacement construction.

The same projects may be used to meet Criteria I, II, and/or III if the project had stream restoration and culvert replacement and soldier pile wall construction of similar size and scope.

The written documentation for the supplemental responsible bidder criteria shall be submitted in a table using the format below within two (2) business days of the bid opening. If the contact person cannot be reached at the phone number provided, then that project will not be considered a valid submittal and may result in the bid being considered nonresponsive.

Project Name	Project Owner Name/Phone	Description Of Project Scope Related To Culvert Replacement Construction

III. Bidder's Prior Work Experience Constructing Soldier Pile Walls

A. Criterion: The Bidder or its subcontractor(s) shall have prior experience on a minimum of three projects of similar size and scope to the subject project from within the five years prior to the bid submittal date. If a subcontractor is used to meet this Criterion, the Bidder shall be responsible for retaining the subcontractor for the duration of the soldier pile wall construction.

B. Documentation: The Bidder or its subcontractor(s), if and when required as detailed below, shall submit a list of at least three public works projects completed in the five years prior to the bid submittal date that have had culvert replacement and soldier pile wall construction of similar size and scope and include for each project the following information:

- Name of project
- The owner and contact information for the owner;
- A written description of the project scope or portions of the project scope as they relate to soldier pile wall construction.

The same projects may be used to meet Criteria I, II, and/or III if the project had stream restoration and culvert replacement and soldier pile wall construction of similar size and scope.

The written documentation for the supplemental responsible bidder criteria shall be submitted in a table using the format below within two (2) business days of the bid opening. If the contact person cannot be reached at the phone number provided, then that project will not be considered a valid submittal and may result in the bid being considered nonresponsive.

Project Name	Project Owner Name/Phone	Description Of Project Scope Related To Soldier Pile Wall Construction

The Contracting Agency reserves the right to request further documentation as needed from the low bidder and documentation from other Bidders as well to assess Bidder responsibility and compliance with all bidder responsibility criteria. The Contracting Agency also reserves the right to obtain information from third-parties and independent sources of information concerning a Bidder's compliance with the mandatory and supplemental criteria, and to use that information in their evaluation. The Contracting Agency may consider mitigating factors in determining whether the Bidder complies with the requirements of the Supplemental Criteria.

The basis for evaluation of Bidder compliance with these mandatory and Supplemental Criteria shall include any documents or facts obtained by Contracting Agency (whether from the Bidder or third parties) including but not limited to: (i) financial, historical, or operational data from the Bidder; (ii) information obtained directly by the Contracting Agency from others for whom the Bidder has worked, or other public agencies or private enterprises; and (iii) any additional information obtained by the Contracting Agency which is believed to be relevant to the matter.

If the Contracting Agency determines the Bidder does not meet the bidder responsibility criteria above and is therefore not a responsible Bidder, the Contracting Agency shall notify the Bidder in writing, with the reasons for its determination. If the Bidder disagrees with this determination, it may appeal the determination within two (2) business days of the Contracting Agency's determination by presenting its appeal and any additional information to the Contracting Agency. The Contracting Agency will consider the appeal and any additional information before issuing its final determination. If the final determination affirms that the Bidder is not responsible, the Contracting Agency will not execute a contract with any other Bidder until at least two business days after the Bidder determined to be not responsible has received the Contracting Agency's final determination.

Request to Change Supplemental Bidder Responsibility Criteria Prior To Bid: Bidders with concerns about the relevancy or restrictiveness of the Supplemental Bidder Responsibility Criteria may make or submit requests to the Contracting Agency to modify the criteria. Such requests shall be in writing, describe the nature of the concerns, and propose specific modifications to the criteria. Bidders shall submit such requests to the Contracting Agency no later than five (5) business days prior to the bid submittal deadline and address the request to the person designated by the Contracting Agency in the Bid Documents.

10. BID SUBMISSION

Forms I through V, provided herein, must be executed by **ALL BIDDERS** prior to submittal of the bid and, except where otherwise provided herein, must be submitted with the bid.

I PROPOSAL/CONSTRUCTION CONTRACT AND BID FORM

The unit prices must be shown in the spaces provided. The Proposal must be signed. Unit prices for all items, all extensions and the total amount of the bid must be shown. Show unit prices in both figures and words. Where a conflict occurs, the written or typed words shall prevail. All entries must be typed or entered in ink. **BIDDERS MUST BID ON ALL ITEMS CONTAINED IN THE PROPOSAL.** The omission or deletion of any bid item will be considered non-responsive and shall be cause for rejection of the bid.

II NONCOLLUSION CERTIFICATE

To be completed, signed and notarized.

III BIDDER'S QUALIFICATION CERTIFICATE

To be completed and signed. The Stillaguamish Tribe of Indians reserves the right to check all statements and to judge the adequacy of the bidder's qualifications.

IV SUBCONTRACTORS LIST

To be completed by all bidders within one hour of the bid opening. This form is required on all projects with construction costs of one million dollars or more.

V BID PROPOSAL BOND FORM

Provide either a Deposit or Bond. The BID PROPOSAL BOND must be executed by the bidder and the surety company. The amount of BID PROPOSAL DEPOSIT shall not be less than 5% of the Total Bid Price and may be shown in dollars or on a percentage basis.

Forms VI, VII, VIII, IX, and X provided herein, to be completed by the **SUCCESSFUL** bidder.

VI CONTRACT BOND

To be executed by the successful bidder and their surety.

VII SNOHOMISH COUNTY RIGHT-OF-WAY PERFORMANCE BOND AND SECURITY

To be executed by the successful bidder and their surety.

VIII SNOHOMISH COUNTY EROSION CONTROL PERFORMANCE BOND AND SECURITY - ASSIGNMENT OF FUNDS

To be executed by the successful bidder and their surety.

IX SNOHOMISH COUNTY INSURANCE REQUIREMENTS

To be completed and submitted by the successful bidder.

X CONTRACT FORM / AGREEMENT FORM

To be signed by the successful bidder.

SECTION II - PROJECT PROPOSAL

I BID FORMS

II BIDDER'S QUALIFICATION CERTIFICATE

III SUBCONTRACTORS LIST

IV BID PROPOSAL BOND FORM

V NON-COLLUSION DECLARATION

VI CERTIFICATION FOR STILLAGUAMISH CONTRACTS

VII DEBARMENT, SUSPENSION, INELIGIBILITY OR VOLUNTARY EXCLUSION CERTIFICATE FORM

VIII IRS FORM W-9 REQUEST FOR TAXPAYER IDENTIFICATION NUMBER AND CERTIFICATION

IX PROJECT PROPOSAL SIGNATURE PAGE

Project Kackman Creek Culvert Replacement Project Date:

SCHEDULE "C" -- CIVIL/ROAD ELEMENTS

THE CONTRACTOR SHALL INCLUDE FOR COMPENSATION THE AMOUNT OF ANY TAXES PAID IN THE VARIOUS UNIT BID PRICES IN ACCORDANCE WITH SECTION 1-07.2(1)

BID ITEM	STD ITEM	SPEC REF	ITEM DESCRIPTION	UNIT MEASURE	QUANTITY	UNIT PRICE	COST
C-001	0001	1-09.7	MOBILIZATION	LUMP SUM	1		
C-002	7038	1.05.4 GSP	ROADWAY SURVEYING	LS	1		
C-003	SPECIAL	1-07.6(2)	SWPPP PREPARATION AND MAINTENANCE	LS	1		
C-004	7736	1-07.15(1)	SPCC PLAN	LS	1		
C-005	6971	1-10 GSP	PROJECT TEMPORARY TRAFFIC CONTROL	LS	1		
C-006	6980	1-10	FLAGGERS	HR	1,120		
C-007	6993	1-10	PORTABLE CHANGEABLE MESSAGE SIGN	HR	340		
C-008	0050	2-02 SP	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1		
C-009	SPECIAL	2-02	REMOVAL OF STRUCTURES AND OBSTRUCTIONS - ASPHALT	TON	460		
C-010	SPECIAL	2-02	SAWCUTTING	IN-FT	820		
C-011	0310	2-03	ROADWAY EXCAVATION INCL. HAUL	CY	330		
C-012	5100	4-04	CRUSHED SURFACING BASE COURSE	TON	360		
C-013	5120	4-04	CRUSHED SURFACING TOP COURSE	TON	20		
C-014	5767	5-04 GSP	HMA CL.1/2 IN. PG-64-22	TON	205		
C-015	5769	5-04 GSP	HMA CL. 1 IN. PG-64-22	TON	205		
C-016	SPECIAL	7-04	SCHEDULE A STORM SEWER PIPE 8 IN. DIAM.	LF	11		
C-017	3541	7-04 SP	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	LF	94		
C-018	3090	7-05	CATCH BASIN TYPE 1L W/ RECTANGULAR FRAME & VANED GRATE	EA	1		
C-019	3105	7-05	CATCH BASIN TYPE 2 48 IN. DIAM. W/ RECTANGULAR FRAME & VANED GRATE	EA	1		
C-020	6488	8-01	EROSION CONTROL AND WATER POLLUTION PREVENTION	LS	1		
C-021	6630	8-01	HIGH VISIBILITY FENCE	LF	1,290		
C-022	6403	8-01 SP	ESC LEAD	DAY	26		
C-023	6555	8-02	SOD INSTALLATION	SY	120		
C-024	6727	8-04	EXTRUDED CURB	LF	195		
C-025	6711	8-11	BEAM GUARDRAIL TYPE 31 - 8 FT. LONG POST	LF	70		
C-026	6759	8-11	BEAM GUARDRAIL TYPE 10	LF	120		
C-027	6719	8-11	BEAM GUARDRAIL TYPE 31 NON-FLARED TERMINAL	EA	2		
C-028	6760	8-11	BEAM GUARDRAIL TRANSITION SECTION TYPE 24	EA	2		
C-029	7084	8-12	CHAIN LINK FENCE TYPE 4	LF	150		
C-030	7097	8-12	END, GATE, CORNER, AND PULL POST FOR CHAIN LINK FENCE	EA	6		
C-031	6890	8-21	PERMANENT SIGNING	LS	1		
C-032	6806	8-22	PAINT LINE	LF	475		
C-033	6807	8-22	PLASTIC LINE	LF	590		
C-034	0431	9-03.14(1)	GRAVEL BORROW INCL. HAUL	TON	960		
						SubTotal Schedule C:	**$ -**

The above unit prices shall be utilized for any additive and deductive work within 15% of the TOTAL CONTRACT ESTMATED BID QUANTITY. The unit price shall provide the contractor with full compensation for the cost of labor, materials, equipment, overhead, profit and any additional costs associated with the unit bid.

Project Kackman Creek Culvert Replacement Project Date:

SCHEDULE "R" -- RESTORATION ELEMENTS

THE CONTRACTOR SHALL INCLUDE FOR COMPENSATION THE AMOUNT OF ANY TAXES PAID IN THE VARIOUS UNIT BID PRICES IN ACCORDANCE WITH SECTION 1-07.2(1)

BID ITEM	STD ITEM	SPEC REF	ITEM DESCRIPTION	UNIT MEASURE	QUANTITY	UNIT PRICE	COST
R-001	0001	1-09.7	MOBILIZATION (9%)	LUMP SUM	1		
R-002	7038	1.05.4	RESTORATION SURVEYING	LS	1		
R-003	0025	2-01	CLEARING AND GRUBBING	ACRE	0.50		
R-004	SPECIAL	2-01 SP	SELECTIVE CLEARING AND GRUBBING - BUFFER MITIGATION AREA	ACRE	0.32		
R-005	1040	2-03	CHANNEL EXCAVATION INCL. HAUL	CY	2,710		
R-006	SPECIAL	2-03 SP	EMBANKMENT COMPACTION INCL. HAUL	CY	110		
R-007	SPECIAL	2-03 SP	DITCH EXCAVATION INCL. HAUL	CY	50		
R-008	SPECIAL	2-03 SP	TERRACED BANK RESTORATION FOR STEEP SLOPES	SY	67		
R-009	SPECIAL	2-03 SP	COIR BANK RESTORATION ABOVE LOG STRUCTURES	SY	205		
R-010	SPECIAL	2-03 SP	BANK RESTORATION FOR SHALLOW SLOPES	SY	240		
R-011	SPECIAL	2-03 SP	COIR AND ROCK BANK RESTORATION ADJACENT TO BRIDGE	SY	108		
R-012	6488	8-01	TEMPORARY FLOW BYPASS AND FISH EXCLUSION PLAN	LS	1		
R-013	SPECIAL	8-01 SP	TEMPORARY FLOW BYPASS AND FISH EXCLUSION	LS	1		
R-014	SPECIAL	8-02 SP	DECOMPACTION FOR BUFFER MITIGATION AREA	ACRE	0.32		
R-015	6412	8-02	SEEDING AND FERTILIZING	ACRE	0.67		
R-016	6419	8-02	SEEDING AND FERTILIZING BY HAND	SY	555		
R-017	6435	8-02	MULCHING	ACRE	0.32		
R-018	6552	8-02	PSIPE 2-GALLON TREES	EA	84		
R-019	6552	8-02	PSIPE 1-GALLON SHRUBS	EA	1,004		
R-020	6552	8-02	PSIPE 4-INCH POT	EA	622		
R-021	6552	8-02	PSIPE 4- TO 6-INCH PLUGS	EA	229		
R-022	6552	8-02	PSIPE 10-INCH DEEP ROOT PLUGS	EA	107		
R-023	6552	8-02	PSIPE LIVE STAKES	EA	438		
R-024	SPECIAL	8-05 SP	BANK LOG STRUCTURE	EA	2		
R-025	SPECIAL	8-05 SP	REVETMENT LOG STRUCTURE	EA	2		
R-026	0921	9-03	ROCK FOR EROSION AND SCOUR PROTECTION	TN	50		
R-027	1086	9-03	QUARRY SPALL FILTER BLANKET	TN	20		
R-028	SPECIAL	9-03 SP	ROUGHENED CHANNEL MIX	TN	1,530		
R-029	1073	9-03 SP	LIGHT LOOSE RIPRAP	TN	660		
						SubTotal Schedule R:	**$ -**

The above unit prices shall be utilized for any additive and deductive work within 15% of the TOTAL CONTRACT ESTMATED BID QUANTITY. The unit price shall provide the contractor with full compensation for the cost of labor, materials, equipment, overhead, profit and any additional costs associated with the unit bid.

Project Kackman Creek Culvert Replacement Project Date:

SCHEDULE "S" -- STRUCTURAL/BRIDGE ELEMENTS

THE CONTRACTOR SHALL INCLUDE FOR COMPENSATION THE AMOUNT OF ANY TAXES PAID IN THE VARIOUS UNIT BID PRICES IN ACCORDANCE WITH SECTION 1-07.2(1)

BID ITEM	STD ITEM	SPEC REF	ITEM DESCRIPTION	UNIT MEASURE	QUANTITY	UNIT PRICE	COST
S-001	0001	1-09.7	MOBILIZATION	LUMP SUM	1		
S-002	7728	1-04.4(1)	MINOR CHANGE	EST	FA	$20,000.00	$20,000.00
S-003	7037	1-05.4 GSP	STRUCTURE SURVEYING	LS	1		
S-004	SPECIAL	1-05.18 GSP	RECORD DRAWINGS (MINIMUM BID $5,500)	LS	1		
S-005	7003	1-02.6 GSP	MIN BID REQ - TYPE B PROGRESS SCHEDULE $5,500	LS	1		
S-006	4006	2-09	STRUCTURAL EXCAVATION CLASS A INCL. HAUL	CY	190		
S-007	4013	2-09	SHORING OR EXTRA EXCAVATION CL. A	SF	500		
S-008	4149	6-02	ST. REINF. BAR FOR BRIDGE	LB	10,500		
S-009	4322	6-02	CONC. CL 4000 FOR BRIDGE	CY	75		
S-010	4300	6-02	SUPERSTRUCTURE KACKMAN CREEK BRIDGE	LS	1		
S-011	4025	6-02	GRAVEL BACKFILL FOR WALL	CY	100		
S-012	4060	6-05 SP	FURNISHING AND DRIVING CONCRETE TEST PILE	EACH	2		
S-013	4070	6-05	FURNISHING CONC. PILING 24 IN. DIAM.	LF	1,000		
S-014	4080	6-05	DRIVING CONC. PILE 24 IN. DIAM.	EACH	12		
S-015	SPECIAL	6-06	BRIDGE RAILING TYPE SNOHOMISH COUNTY	LF	220		
S-016	0254	6-16	REMOVING SOLDIER PILE SHAFT OBSTRUCTIONS	EST	1	$14,500.00	$14,500.00
S-017	4048	6-16	SHAFT - 30 IN. DIAMETER	LF	480		
S-018	4053	6-16	FURNISHING SOLDIER PILE	LF	675		
S-019	4299	6-16	LAGGING	SF	1,170		
S-020	4474	6-16	CONCRETE FASCIA PANEL	SF	210		
S-021	0256	6-19	REMOVING SHAFT OBSTRUCTIONS	EST	FA	$20,000.00	$20,000.00
						SubTotal Schedule S:	

The above unit prices shall be utilized for any additive and deductive work within 15% of the TOTAL CONTRACT ESTMATED BID QUANTITY. The unit price shall provide the contractor with full compensation for the cost of labor, materials, equipment, overhead, profit and any additional costs associated with the unit bid.

Project **Kackman Creek Culvert Replacement Project** **Date** _____

Construction in 2020 is predicated on obtaining funding and all applicable permits to allow construction in the allowable work period specified in this contract. Bid and unit prices shall be binding for the duration of the contract.

COST ELEMENT	COST
SUBTOTAL SCHEDULE C CIVIL/ROAD ELEMENTS	
SUBTOTAL SCHEDULE R RESTORATION ELEMENTS	
SUBTOTAL SCHEDULE S STRUCTURAL/BRIDGE ELEMENTS	
PROJECT SUBTOTAL (SCH. C, R, S)	
Sales Tax Rate @ 7.80% (PROJECT SUBTOTAL)	
TOTAL CONTRACT BID AMOUNT	

Signature _____

Printed Name _____

Company Name _____

END OF BID FORM

II BIDDER'S QUALIFICATION CERTIFICATE

The undersigned hereby certifies and submits the following qualifications:

I. Name and Address _____

_____

2. Washington Registration No. _____ Expires: _____/_____/_____(M/D/Y)

3. Number of years in contracting business under present name: _ years

4. Particular types of construction work performed by your company:

_____

_____

5. List and provide a brief summary of several recent construction projects performed that meet the **SUPPLEMENTAL RESPONSIBLE BIDDER CRITERIA** as specified in this contract:

Project 1 Name: _____

Contractor project manager name and phone number: _____

_____

Owner name and phone number: _____

_____

Owner's project manager name and phone number: _____

_____

Description of project and how project meets Supplemental Responsible Bidder

Criteria: _____

_____

_____

_____

_____

Initial contract value: _____

Final contract value: _____

Initial contract time: _____ to _____

Final contract time:_____ to _____

Hydraulic Project Approval Permit Number:_____

Project 2 Name:_____

Contractor project manager name and phone number:_____

_____

Owner name and phone number:_____

_____

Owner's project manager name and phone number:_____

_____

Description of project and how project meets Supplemental Responsible Bidder Criteria:_____

_____

_____

_____

_____

Initial contract value:_____

Final contract value:_____

Initial contract time:_____ to _____

Final contract time:_____ to _____

Hydraulic Project Approval Permit Number:_____

Project 3 Name:_____

Contractor project manager name and phone number:_____

_____

Owner name and phone number:_____

_____

Owner's project manager name and phone number:_____

_____

Description of project and how project meets Supplemental Responsible Bidder Criteria:_____

_____

_____

_____

Initial contract value:_____

Final contract value:_____

Initial contract time:_____ to _____

Final contract time:_____ to _____

Hydraulic Project Approval Permit Number:_____

Project 4 Name:_____

Contractor project manager name and phone number:_____

Owner name and phone number:_____

Owner's project manager name and phone number:_____

Description of project and how project meets Supplemental Responsible Bidder

Criteria:_____

Initial contract value:_____

Final contract value:_____

Initial contract time:_____ to _____

Final contract time:_____ to _____

Hydraulic Project Approval Permit Number:_____

Project 5 Name: _____

Contractor project manager name and phone number:_____

Owner name and phone number:_____

Owner's project manager name and phone number:_____

Description of project and how project meets Supplemental Responsible Bidder Criteria:

Initial contract value:

Final contract value:

Initial contract time: to

Final contract time: to

Hydraulic Project Approval Permit Number:

6. Gross amount of contracts now in hand $

7. Bank Reference(s):

	Name	Address	Account No.	Type
a.				
b.				

By: Title:
(Authorized Signature)

8. Litigation Background (all projects in past 5 years resulting in partial or final settlement of the contract by arbitration or litigation in the courts):

	Client	Contract Amount	Total $ claims	Settlement $
a.				
b.				

9. Choose one of the following:

☐ Bidder has Industrial Insurance coverage for employees working in Washington as required in Title 51 RCW; or

☐ Bidder is not required to have Industrial Insurance coverage as required in Title 512 RCW.

10. Choose one of the following:

☐ Bidder's Washington Employment Security Department registration number is _____; or

☐ Bidder is not required to register with the Washington Employment Security Department pursuant to Title 50 RCW.

11. Choose one of the following:

☐ Bidder' Washington State Department of Revenue registration number is: _____; or

☐ Bidder is not required to register with the Washington State Department of Revenue pursuant to Title 82 RCW.

I am the _____ (title) of Bidder, have authority to bind Bidder, am over the age of 18, and have personal knowledge of the facts set forth above.

Dated this _____ day of _____, 2016, at _____ (city),

_____ (state).

Signature _____

Print Name _____

Title _____

End of Bidder's Qualification Certificate

III SUBCONTRACTORS LIST

The bidder shall submit, as part of the bid, the names of the subcontractors with whom the bidder, if awarded the contract, will subcontract for performance of the work. The bidder shall not list more than one subcontractor for each category of work identified, unless subcontractors vary with bid alternates, in which case the bidder must indicate which subcontractor will be used for which alternate. **Failure of the bidder to submit as part of the bid the names of such subcontractors or to name itself to perform such work or the naming of two or more subcontractors to perform the same work shall render the bidder's bid nonresponsive and, therefore, void.** This form is prepared in compliance with RCW 39.30.060 as amended. Bidder may provide additional pages if necessary.

THE KACKMAN CREEK CULVERT REPLACEMENT PROJECT

_____:
Subcontractor Name_____ **WA License #** _____
Item Numbers _____
Description of work:_____
_____
_____

_____:
Subcontractor Name_____ **WA License #** _____
Item Numbers _____
Description of work:_____
_____
_____

_____:
Subcontractor Name_____ **WA License #** _____
Item Numbers _____
Description of work:_____
_____
_____

_____:
Subcontractor Name_____ **WA License #** _____
Item Numbers _____
Description of work:_____
_____
_____

Bid Item numbers to be performed by the prime contractor: (_____)
Prime Contractor Name

Item Numbers _____
Description of Work: _____

End of Subcontractor List Form

IV BID PROPOSAL BOND FORM

Herewith find deposit in the form of a certified or cashier's check in the amount of $_____
which amount is not less than five percent (5%) of the total bid.

_____
Signature

BID PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, THAT we _____
as Principal and the _____
a corporation duly organized under the laws of the state of _____ , and authorized to do business in the State of Washington, as surety, as held and firmly bound unto the Stillaguamish Tribe of Indians in the full and penal sum of five (5) percent of the total amount of the bid proposal of said principal for the work hereinafter described, for the payment of which, well and truly to be made, we bind our heirs, executors, administrators and assigns, and successors and assigns, firmly by these presents.

The condition of this bond is such, that whereas the principal herein is herewith submitting his or its sealed proposal for the following highway construction, to wit:

Improvements for the KACKMAN CREEK CULVERT REPLACEMENT PROJECT to include: temporary erosion and sediment control, traffic control, clearing and grubbing, culvert removal, excavation and haul, grading, storm drainage and ditch construction, bridge and soldier pile wall construction, stream flow bypass and fish exclusion, stream channel and bank grading and restoration, paving, curb, railing, pavement markings and permanent signage installation, seeding, mulching, and planting with native plant species, and other work, all in accordance with the Bid Documents, Contract Plans, Special Provisions, and the Standard Specifications

Said bid and proposal, by reference thereto, being made a part hereof.
NOW THEREFORE, If the said proposal bid by said principal be accepted, and the contract be awarded to said principal, and if said principal shall duly make and enter into and execute said contract and shall furnish bond as required by the Stillaguamish Tribe of Indians within a period of ten (10) days from and after said award, exclusive of the day of such award, then this obligation shall be null and void, otherwise it shall remain and be in full force and effect.

IN TESTIMONY WHEREOF, The principal and surety have caused these presents to be signed, sealed this _____ day of _____, _____.

Principal	Attorney-in-fact
Surety	Surety Phone No. Surety Fax No.

End of Bid Proposal Bond Form

Failure to return this Declaration as part of the bid proposal package will make the bid nonresponsive and ineligible for award.

NON-COLLUSION DECLARATION

I, by signing the proposal, hereby declare, under penalty of perjury under the laws of the United States that the following statements are true and correct:

1. That the undersigned person(s), firm, association or corporation has (have) not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the project for which this proposal is submitted.
2. **That by signing the signature page of this proposal, I am deemed to have signed and to have agreed to the provisions of this declaration.**

NOTICE TO ALL BIDDERS

To report rigging activities call:

1-800-424-9071

The U.S. Department of Transportation (USDOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of USDOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the USDOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

Certification for Stillaguamish Contracts

The prospective participant certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

This certification is material representation of the fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such subrecipients shall certify and disclose accordingly.

Debarment, Suspension, Ineligibility or Voluntary Exclusion Certification Form

NAME	Doing business as (DBA)	
ADDRESS	WA Uniform Business Identifier (UBI)	Federal Employer Tax Identification #:
This certification is submitted as part of a request to contract.		

This certification is required by regulations implementing Executive Order 12549, Debarment and Suspension. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE

(1) The prospective lower tier participant certifies, by submission of this proposal or contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this form.

Organization Name | Project Name

Name(s) and Title(s) of Authorized Representative(s)

Signature(s) | Date

Instructions For Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion Lower Tier Covered Transactions

READ CAREFULLY BEFORE SIGNING THE CERTIFICATION. Federal regulations require contractors and bidders to sign and abide by the terms of this certification, without modification, in order to participate in certain transactions directly or indirectly involving federal funds.

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the department, institution or office to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or had become erroneous by reason of changed circumstances.
4. The terms covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this clause, have the meaning set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is proposed for debarment under the applicable CFR, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled ``Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction,'' without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not proposed for debarment under applicable CFR, debarred, suspended, ineligible, or voluntarily excluded from covered transactions, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the List of Parties Excluded from Federal Procurement and Non-procurement Programs.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business activity.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is proposed for debarment under applicable CFR, suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Form **W-9**
(Rev. October 2018)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

▶ **Go to *www.irs.gov/FormW9* for instructions and the latest information.**

Give Form to the requester. Do not send to the IRS.

Print or type. See **Specific Instructions** on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN,* later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–			–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here	**Signature of U.S. person ▶**	**Date ▶**

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9.*

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, *later.*

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and

4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting,* later, for further information.

Note: If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States.

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Pub. 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items.

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 24% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,

2. You do not certify your TIN when required (see the instructions for Part II for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code,* later, and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships,* earlier.

What is FATCA Reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code,* later, and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account (other than an account maintained by a foreign financial institution (FFI)), list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9. If you are providing Form W-9 to an FFI to document a joint account, each holder of the account that is a U.S. person must provide a Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note: ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C corporation, or S corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box on line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box on line 3.

IF the entity/person on line 1 is a(n) . . .	THEN check the box for . . .
• Corporation	Corporation
• Individual • Sole proprietorship, or • Single-member limited liability company (LLC) owned by an individual and disregarded for U.S. federal tax purposes.	Individual/sole proprietor or single-member LLC
• LLC treated as a partnership for U.S. federal tax purposes, • LLC that has filed Form 8832 or 2553 to be taxed as a corporation, or • LLC that is disregarded as an entity separate from its owner but the owner is another LLC that is not disregarded for U.S. federal tax purposes.	Limited liability company and enter the appropriate tax classification. (P= Partnership; C= C corporation; or S= S corporation)
• Partnership	Partnership
• Trust/estate	Trust/estate

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space on line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2—The United States or any of its agencies or instrumentalities

3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 5[2]
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note: You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns. If this address differs from the one the requester already has on file, write NEW at the top. If a new address is provided, there is still a chance the old address will be used until the payor changes your address in their records.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN.

If you are a single-member LLC that is disregarded as an entity separate from its owner, enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note: See *What Name and Number To Give the Requester,* later, for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.SSA.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/Businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. Go to *www.irs.gov/Forms* to view, download, or print Form W-7 and/or Form SS-4. Or, you can go to *www.irs.gov/OrderForms* to place an order and have Form W-7 and/or SS-4 mailed to you within 10 business days.

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note: Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if item 1, 4, or 5 below indicates otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code,* earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), ABLE accounts (under section 529A), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account) other than an account maintained by an FFI	The actual owner of the account or, if combined funds, the first individual on the account[1]
3. Two or more U.S. persons (joint account maintained by an FFI)	Each holder of the account
4. Custodial account of a minor (Uniform Gift to Minors Act)	The minor[2]
5. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee[1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner[1]
6. Sole proprietorship or disregarded entity owned by an individual	The owner[3]
7. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	**Give name and EIN of:**
8. Disregarded entity not owned by an individual	The owner
9. A valid trust, estate, or pension trust	Legal entity[4]
10. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
11. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
12. Partnership or multi-member LLC	The partnership
13. A broker or registered nominee	The broker or nominee
14. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
15. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships,* earlier.

***Note:** The grantor also must provide a Form W-9 to trustee of trust.

Note: If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records From Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Pub. 5027, Identity Theft Information for Taxpayers.

Victims of identity theft who are experiencing economic harm or a systemic problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov.* You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at *spam@uce.gov* or report them at *www.ftc.gov/complaint.* You can contact the FTC at *www.ftc.gov/idtheft* or 877-IDTHEFT (877-438-4338). If you have been the victim of identity theft, see *www.IdentityTheft.gov* and Pub. 5027.

Visit *www.irs.gov/IdentityTheft* to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

KACKMAN CREEK CULVERT REPLACEMENT AT 55TH AVE

PROPOSAL SIGNATURE FORM

_____

Date:

To: Stillaguamish Tribe of Indians

The bidder is hereby advised that by signature of this Project Proposal he/she is deemed to have acknowledged all requirements and signed all certificates contained herein.

A proposal guaranty in an amount of five percent (5%) of the total bid is attached hereto:

☐

_____

CASHIER'S CHECK DOLLARS

☐

☐

☐

_____

_____

MONEY ORDER ($)

PAYABLE TO THE STILLAGUAMISH TRIBE OF INDIANS CERTIFIED CHECK ($)

PAYABLE TO THE STILLAGUAMISH TRIBE OF INDIANS BID BOND

IN THE AMOUNT OF 5% OF THE TOTAL BID

** Receipt is hereby acknowledged of addendum(s) _____ ,_____&

_____

SIGNATURE OF AUTHORIZED OFFICAL (S)

_____

_____

FIRM NAME

_____

_____

_____

(ADDRESS)

SECTION III – CONTRACT FORMS AND CERTIFICATES

I CONTRACT BOND

II TITLE 13 SCC RIGHT-OF-WAY PERFORMANCE SECURITY – BOND

III TITLE 13 SCC RIGHT-OF-WAY PERFORMANCE SECURITY – ASSIGNMENT OF FUNDS

IV TITLE 30 SCC EROSION CONTROL PERFORMANCE SECURITY – BOND

V TITLE 30 SCC EROSION CONTROL PERFORMANCE SECURITY – ASSIGNMENT OF FUNDS

VI SNOHOMISH COUNTY INSURANCE REQUIREMENTS

VII STILLAGUAMISH TRIBE OF INDIANS SAMPLE CONTRACT

Contract Bond –
Highway Construction

KNOW ALL MEN BY THESE PRESENTS, That

of _____, as Principal, and _____ as Surety, are jointly and severally held and bound unto the Stillaguamish Tribe of Indians, in the penal sum of _____ Dollars ($_____), the payment of which we jointly and severally bind ourselves, our heirs, executors, administrators, and assigns, and successors and assigns, firmly by these presents.

The CONDITION of this bond is such that WHEREAS on the _____ day of _____ A.D., _____, the said _____, Principal, herein, executed a certain contract with the Stillaguamish Tribe of Indians, by the terms, conditions and provisions of which contract the said _____, Principal, herein, agree to furnish all material and do certain work, to wit: That will undertake and complete the construction of:

> *Improvements for the 35th Avenue Reconstruction project to include: clearing and grubbing, miscellaneous item removal, grading, storm drainage, pond construction, utility vault and trenching, curb, gutter, sidewalk, paving, illumination, permanent signing, pavement markings, erosion and traffic control, and other work, all in accordance with the Bid Documents, Contract Plans, Special Provisions, and the Standard Specifications.*

according to the maps, plans and specifications made a part of said contract, which contract as to executed, is hereunto attached, is now referred to and by reference is incorporated herein and made a part hereof as fully for all purposes as if here set forth at length. This bond shall cover all approved change orders as if they were in the original contract.

NOW THEREFORE, if the Principal herein shall faithfully and truly observe and comply with the terms, conditions, and provisions of said contract in all respects and shall well and truly and fully do and perform all matters and things by them undertaken to be performed under said contract, upon the terms proposed therein, and within the time prescribed therein, and until the same is accepted, and shall pay all laborers, mechanics, subcontractors, and material men, and all persons who shall supply such contractor or subcontractor with provisions and supplies for the carrying on of such work, and shall in all respects, faithfully perform said contract according to law, then this obligation to be void, otherwise to remain in full force and effect.

WITNESS our hands this _____ day of _____, _____

_____

_____

_____

(Principal)

_____

_____

_____
(Attorney-in-fact, Surety)

_____
Name and Address Local Office of Agent

APPROVED:

Stillaguamish Tribe of Indians

Tribal Manager

By: _____

Date: _____

Surety Bond No.

Project

TITLE 13 SCC RIGHT-OF-WAY
PERFORMANCE SECURITY - BOND

STATE OF WASHINGTON)
: ss.
COUNTY OF SNOHOMISH)

BOND NO. _____

We, _____ as Principal (the Principal), and _____ as Surety (the Surety), a corporation organized under the laws of the State of _____ and duly authorized to transact Surety business in the State of Washington, are held and firmly bound unto Snohomish County (the County), a political subdivision of the State of Washington, in the amount of $_____, for the payment of which sum we bind ourselves, and each of our executors, administrators, successors and assigns, jointly and severally.

Now, therefore, the conditions of these obligations are such, that if the Principal shall construct and complete all right of way improvements for the project of _____, project file number _____ required under Titles 13 and 30 Snohomish County Code (SCC) and permited under Title 13 SCC, then this obligation shall be void; otherwise the obligations set forth herein shall remain in full force and effect until final inspection and construction acceptance by the County of all improvements.

We further agree that if, during the period this performance security is in effect, either the Director of Snohomish County Planning and Development Services (the Director) or the County Engineer determines the Principal has failed to properly install the improvements, the Director or County Engineer shall notify the Principal and Surety in accordance with SCC 13.10.116. The notice shall describe the work or improvements that must be done to prevent the forfeiture of the security device, provide a date certain by which the required work or improvements must be completed to the Director or County Engineers satisfaction, and state that if the work or improvements are not completed within the time specified, the County may proceed with forfeiture of the security device and use the funds to complete the required work or improvements. The Surety, in accordance with SCC 13.10.116(3), has the option to either pay up to the full security amount to the County upon demand or complete the work according to the County's terms and conditions. The amount demanded by the Director or their designee will be a good faith estimate of the actual cost of the work or improvements to be completed.

We further agree that if it is necessary for the County to take any legal action against any signatory to this agreement to assure the proper completion of this project, the County shall be entitled to its reasonable costs and attorney's fees.

We further agree that in the event the real property upon which the work secured by this security device is annexed into an incorporated municipality, the County, pursuant to SCC 30.84.020(2)(b), shall have the right, at its option and in its sole discretion, to assign the County's interest in this security device to the annexing municipality without the necessity of obtaining a re-issuance of the security device. Should the County assign its interest in this security device to a municipality, the County shall promptly deliver written notice of the assignment to the Surety and the Principal.

Title 13 Right of Way Performance Bond

Project Name: _____

Project File Number: _____

We further agree that the Principal and the Surety shall promptly notify Snohomish County Planning and Development Services of any change of address. Change of addresses notices shall be in writing and shall be mailed to Snohomish County Planning and Development Services, 3000 Rockefeller Ave., M/S 604, Everett, WA 98201. The County will mail only to the last known address of Principal and Surety.

Signed this _____ **day of** _____, _____.

_____	_____
Principal	**Name of Surety**
_____	_____
Address	**Address**
_____	_____
City, State, Zip	**City, State, Zip**
Phone Number: _____	**Phone Number:** _____
_____	_____
Signature of Principal	**Signature of Surety Official**
_____	_____
Please Print Name & Title	**Please Print Name & Title**

Accepted by Snohomish County: _____ **Date:** _____

_____

TITLE 13 SCC RIGHT-OF-WAY
PERFORMANCE SECURITY - ASSIGNMENT OF FUNDS

STATE OF WASHINGTON)
: ss.
COUNTY OF SNOHOMISH)

We hereby agree as Principal (the Principal) that the sum of $_____ will be held in savings account number _____ in the name of _____ for the benefit of Snohomish County to assure performance requirements hereunder.

Now, therefore, the conditions of these obligations are such, that if the Principal shall construct and complete all right of way improvements for the project of _____, project file number _____ required under either Titles 13 or 30, Snohomish County Code (SCC) and permitted under Title 13 SCC, within two years from the date of acceptance of this security, then this obligation shall be void; otherwise the obligations set forth herein shall remain in full force and effect until final inspection and construction acceptance by Snohomish County (the County) of all improvements.

We further agree that if, during the period this performance security is in effect, either the Director of Snohomish County Planning and Development Services (the Director) or the County Engineer determines the Principal has failed to properly install the improvements, the Director or County Engineer shall notify the Principal and Financial Institution in accordance with SCC 13.10.116. The notice shall describe the work or improvements that must be done to prevent the forfeiture of the security device, provide a date certain by which the required work or improvements must be completed to the Director or County Engineers satisfaction, and state that if the work or improvements are not completed within the time specified, the County may proceed with forfeiture of the security device and use the funds to complete the required work or improvements. The Financial Institution, in accordance with SCC 13.10.116(3), has the option to either pay up to the full security amount to the County upon demand or complete the work according to the County's terms and conditions. The amount demanded by the Director or their designee will be a good faith estimate of the actual cost of the work or improvements to be completed.

We further agree that if it is necessary for the County to take any legal action against any signatory to this agreement to assure the proper completion of this project, the County shall be entitled to its reasonable costs and attorney's fees.

We further agree that in the event the real property upon which the work secured by this security device is annexed into an incorporated municipality, the County, pursuant to SCC 13.10.104(3)(b), shall have the right, at its option and in its sole discretion, to assign the County's interest in this security device to the annexing municipality without the necessity of obtaining a re-issuance of the security device. Should the County assign its interest in this security device to a municipality, the County shall promptly deliver written notice of the assignment to the Financial Institution and the Principal.

Title 13 Right of Way Performance Assignment of Funds

Project Name: _____

Project File Number: _____

We further agree that the Principal and the Financial Institution shall promptly notify Snohomish County Planning and Development Services of any change of address. Change of addresses notices shall be in writing and shall be mailed to Snohomish County Planning and Development Services, 3000 Rockefeller Ave., M/S 604, Everett, WA 98201. The county will mail only to the last known address of Principal and Financial Institution.

Signed this _____ **day of** _____, _____.

_____	_____
Principal	**Financial Institution**
_____	_____
Address	**Address**
_____	_____
City, State, Zip	**City, State, Zip**
Phone Number: _____	**Phone Number:** _____
_____	_____
Signature of Principal	**Signature of Bank Official**
_____	_____
Please Print Name & Title	**Please Print Name & Title**

Accepted by Snohomish County: _____ **Date:** _____

_____

TITLE 30 SCC EROSION CONTROL
PERFORMANCE SECURITY - BOND

STATE OF WASHINGTON)
: ss.
COUNTY OF SNOHOMISH)

BOND NO. _____

We, _____ as Principal (the Principal), and _____ as Surety (the Surety), a corporation organized under the laws of the State of _____ and duly authorized to transact Surety business in the State of Washington, are held and firmly bound unto Snohomish County (the County), a political subdivision of the State of Washington, in the amount of $_____, for the payment of which sum we bind ourselves, and each of our executors, administrators, successors and assigns, jointly and severally.

Now, therefore, the conditions of these obligations are such, that if the Principal installs and maintains all erosion control and sediment control measures as shown on the approved stormwater site plan for the project of _____, project file number _____ required under Snohomish County Code (SCC) and abates potential adverse impacts to public and private drainage facilities and property from the failure of the erosion control and sediment control measures until final inspection and construction acceptance by the County of all drainage facilities specified by the stormwater site plan, then this obligation shall be void; otherwise the obligations set forth herein shall remain in full force and effect until released by the County, PROVIDED that the duration of the obligations set forth herein may be extended by the Director of Snohomish County Planning and Development Services (the Director) as provided by SCC 30.84.030.

We further agree, that if, during the period this performance security is in effect, the Director determines that the Principal has failed to regularly and properly maintain the erosion control and sediment control measures and/or the drainage facilities or the erosion control and sediment control measures and/or drainage facilities are not operating as designed, the Director shall notify the Principal and Surety, in accordance with SCC 30.84.050. The notice shall describe the work or improvements that must be done to prevent the forfeiture of the security device, provide a date certain by which the required work or improvements must be completed to the Director's satisfaction, and state that if the work or improvements are not completed within the time specified, the County may proceed with forfeiture of the security device and use the funds to complete the required work or improvements. The Surety, in accordance with SCC 30.84.050(4), has the option to either pay up to the full security amount to the County upon demand or complete the work according to the County's terms and conditions. The amount demanded by the Director or their designee will be a good faith estimate of the actual cost of the work or improvements to be completed.

We further agree that if it is necessary for the County to take any legal action against any signatory to this agreement to assure the proper completion of this project, the County shall be entitled to its reasonable costs and attorney's fees.

We further agree that in the event the real property upon which the work secured by this security device is annexed into an incorporated municipality, the County, pursuant to SCC 30.84.020(2)(b), shall have the right, at its option and in its sole discretion, to assign the County's interest in this security device to the annexing municipality without the necessity of obtaining a re-issuance of the security device. Should the County assign its interest in this security device to a municipality, the County shall promptly deliver written notice of the assignment to the Surety and the Principal.

Project Name: _____

Project File Number: _____

We further agree that the Principal and the Surety shall promptly notify Snohomish County Planning and Development Services of any change of address. Change of addresses notices shall be in writing and shall be mailed to Snohomish County Planning and Development Services, 3000 Rockefeller Ave., M/S 604, Everett, WA 98201. The County will mail only to the last known address of Principal and Surety.

Signed this _____ day of _____, _____.

_____	_____
Principal	**Surety**
_____	_____
Address	**Address**
_____	_____
City, State, Zip	**City, State, Zip**
Phone Number: _____	**Phone Number:** _____
_____	_____
Signature of Principal	**Signature of Surety Official**
_____	_____
Please Print Name & Title	**Please Print Name & Title**

Accepted by Snohomish County: _____ **Date:** _____

_____

TITLE 30 SCC EROSION CONTROL
PERFORMANCE SECURITY - ASSIGNMENT OF FUNDS

STATE OF WASHINGTON)
: ss.
COUNTY OF SNOHOMISH)

We hereby agree as Principal (the Principal) that the sum of $_____ will be held savings account number _____ in the name _____ for the benefit of Snohomish County to assure performar requirements hereunder.

Now, therefore, the conditions of these obligations are such, that if the Principal installs and maintains all erosion control and sediment control measures as shown on the approved stormwater site plan for the project of _____, project file number _____ required under Snohomish County Code and abates potential adverse impacts to public and private drainage facilities and property from the failure of the erosion control and sediment control measures until final inspection and construction acceptance by Snohomish County of all drainage facilities specified by the stormwater site plan, then this obligation shall be void; otherwise the obligations set forth herein shall remain in full force and effect until released by Snohomish County, PROVIDED that the duration of the obligations set forth herein may be extended by the Director of Snohomish County Planning and Development Services (the Director) as provided by SCC 30.84.030.

We further agree, that if, during the period this performance security is in effect, the Director determines that the Principal has failed to regularly and properly maintain the erosion control and sediment control measures and/or the drainage facilities or the erosion control and sediment control measures and/or drainage facilities are not operating as designed, the Director shall notify the Principal and Financial Institution, in accordance with SCC 30.84.050. The notice shall describe the work or improvements that must be done to prevent the forfeiture of the security device, provide a date certain by which the required work or improvements must be completed to the Director's satisfaction, and state that if the work or improvements are not completed within the time specified, the County may proceed with forfeiture of the security device and use the funds to complete the required work or improvements. The Financial Institution, in accordance with SCC 30.84.050(4), has the option to either pay up to the full security amount to the County upon demand or complete the work according to the County's terms and conditions. The amount demanded by the Director or their designee will be a good faith estimate of the actual cost of the work or improvements to be completed.

We further agree that if it is necessary for the County to take any legal action against any signatory to this agreement to assure the proper completion of this project, the County shall be entitled to its reasonable costs and attorney's fees.

We further agree that in the event the real property upon which the work secured by this security device is annexed into an incorporated municipality, the County, pursuant to SCC 30.84.020(2)(b), shall have the right, at its option and in its sole discretion, to assign the County's interest in this security device to the annexing municipality without the necessity of obtaining a re-issuance of the security device. Should the County assign its interest in this security device to a municipality, the County shall promptly deliver written notice of the assignment to the Financial Institution and the Principal.

Project Name: _____

Project File Number: _____

We further agree that the Principal and the Financial Institution shall promptly notify Snohomish County Planning and Development Services of any change of address. Change of addresses notices shall be in writing and shall be mailed to Snohomish County Planning and Development Services, 3000 Rockefeller Ave., M/S 604, Everett, WA 98201. The County will mail only to the last known address of Principal and Financial Institution.

Signed this _____ day of _____, _____.

_____	_____
Principal	**Financial Institution**
_____	_____
Address	**Address**
_____	_____
City, State, Zip	**City, State, Zip**
Phone Number: _____	**Phone Number:** _____
_____	_____
Signature of Principal	**Signature of Bank Official**
_____	_____
Please Print Name & Title	**Please Print Name & Title**

Accepted by Snohomish County: _____ **Date:** _____

_____

Snohomish County

Department of Planning & Development Services

Type D - Drainage/Excavation Permit Insurance Instructions

FOR YOUR INSURANCE BROKER

INSURANCE REQUIREMENTS:
Per Snohomish County Code (SCC) 30.63A.440 (vested before 9/30/2010) and 30.63A.940 (vested on/after 9/30/2010)

- ☐ Certificate of Liability Insurance; ***and***
- ☐ **CG 20 10** Additional Insured - Owners, Lessees or Contractors – Scheduled Person or Organization;
- ☐ **CG 20 37** Additional Insured - Owners, Lessees or Contractors – Completed Operations

(Equivalent endorsements forms may be substituted.)

SUBMIT: Email all 3 documents to Diane Baer in Risk Management at diane.baer@snoco.org
Subject: Project Name:_____; Project File Number:_____***

*****Submittals will not be accepted without the PROJECT NAME and PROJECT FILE NUMBER on the Certificate of Insurance and in the Subject of the email.**

QUESTIONS: Call Diane Baer, Snohomish County Risk Specialist, (425) 388-3760

CERTIFICATE OF INSURANCE INSTRUCTIONS

INSURED must be the name of the party "performing the actual work". If this is not the Insured/ Permittee, their Subcontractor needs to be added as a Co-Applicant to the Permit and provide the insurance. *(Contact Shawn Toevs (s.toevs@snoco.org) for details on adding a Co-Applicant to the permit.)*

MINIMUM SCOPE & LIMITS OF INSURANCE: The Permittee shall maintain coverage at least as broad as and with limits no less than:

General Liability: $1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage, and a $2,000,000 aggregate limit. CG 00 01 current edition;

DESCRIPTION OF OPERATION / LOCATIONS / VEHICLE should include all 3 items below:

1. **PROJECT NAME: (Contact Insured for this information)** ***and***
2. **PROJECT FILE NUMBER (PFN):_____** ***and***
3. **ADDITIONAL INSURED**: Snohomish County, its officers, elected officials, agents and employees

CERTIFICATE HOLDER should read: Snohomish County
Planning & Development Svcs – Insurance
3000 Rockefeller Ave, M/S 610
Everett, WA 98201-4046

WHY CG 20 10 & CG 20 37 ADDITIONAL INSURED ENDORSEMENTS?

A Type D Permit is issued by the Snohomish County Department of Planning & Development Services for construction that includes "land disturbance" in the County's right of way property. Snohomish County is acting as the "Land Owner" and not a Regulatory Agency. Snohomish County Code (SCC) requires 2 years of additional insurance coverage once the project is completed.

POLICY NUMBER: (Insert Policy Number)

COMMERCIAL GENERAL LIABILITY
CG 20 10 04 13

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)	Location(s) Of Covered Operations
Snohomish County, its officers, elected officials, agents & employees	PROJECT NAME: _____ PROJECT FILE NUMBER: _ _ - _ _ _ _ _ _
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. **Section II – Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

Sample

© Insurance Services Office, Inc., 2012

C. With respect to the insurance afforded to these additional insureds, the following is added to **Section III – Limits Of Insurance:**

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or

2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

Sample

 © Insurance Services Office, Inc., 2012

POLICY NUMBER: (Insert Policy Number)

COMMERCIAL GENERAL LIABILITY
CG 20 37 04 13

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – COMPLETED OPERATIONS

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)	Location And Description Of Completed Operations
Snohomish County, its officers, elected officials, agents & employees	PROJECT NAME: _____ PROJECT FILE NUMBER __ - _____
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

Sample

A. Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the Schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following is added to **Section III – Limits Of Insurance:**

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or
2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

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CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 01/29/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Name & Contact information of Representative issuing Certificate
The Incredible Insurance Agency Street Address Any Town, USA	PHONE (A/C, No, Ext): FAX (A/C, No):
	E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Company A Insurance Co (Rating of A-VII or better)	
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED: Permit Applicant or Excavation Sub-Contractor (Co-Applicant)
(Whoever is performing the excavation work)

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [X] POLICY [ ] PRO-JECT [ ] LOC OTHER:	Y		CGL12345678	01/01/2016	01/01/2017	EACH OCCURRENCE	$ 1,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 100,000
							MED EXP (Any one person)	$ 5,000
							PERSONAL & ADV INJURY	$ 1,000,000
							GENERAL AGGREGATE	$ 2,000,000
							PRODUCTS - COMP/OP AGG	$ 2,000,000
								$
	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS HIRED AUTOS SCHEDULED AUTOS NON-OWNED AUTOS						COMBINED SINGLE LIMIT (Ea accident)	$
							BODILY INJURY (Per person)	$
							BODILY INJURY (Per accident)	$
							PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB [ ] OCCUR EXCESS LIAB [ ] CLAIMS-MADE DED RETENTION $						EACH OCCURRENCE	$
							AGGREGATE	$
								$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N [ ] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A					PER STATUTE [ ] OTH-ER	
							E.L. EACH ACCIDENT	$
							E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

PROJECT NAME: _____
PROJECT FILE NUMBER: __-_____
ADDITIONAL INSURED: Snohomish County, its officers, elected officials, agents and employees

CERTIFICATE HOLDER

Snohomish County
Planning & Development Svcs - Insurance
3000 Rockefeller Avenue, M/S 610
Everett, WA 98201-4046

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Signature of Representative

Sample

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VII STILLAGUAMISH TRIBE OF INDIANS SAMPLE CONTRACT

STILLAGUAMISH TRIBE OF INDIANS

GENERAL CONTRACTOR SERVICES

This Contract ("Contract") for General Contractor services is made and entered into within the Stillaguamish Tribe of Indians, Indian Country, this __ day of ___, 2020,("Effective Date") by and between the STILLAGUAMISH TRIBE OF INDIANS a sovereign, Federally Recognized Tribe ("Tribe"), whose principal office is at 3322 236th St NE, Arlington, WA 98223, and Bidder **"**Contractor**"**), whose principal office is at _____ PH: _____ email:_____

ARTICLE 1 EXECUTION, CORRELATION AND INTENT

§ 1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Contract, and any Drawings, Specifications, Attachments, or other documents listed herein, and Modifications issued after execution of this Contract, which are attached to this Contract, and which are labeled as Attachments to this Contract; all of which form the Contract. If anything in other Contract Documents is inconsistent with this Contract, this Contract shall govern.

§ 1.2 THE WORK OF THIS CONTRACT

Contractor shall fully execute the Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others. Nothing in this Contract shall create a contractual relationship between the Tribe and any person or entity other the Contractor.

ARTICLE 2 OWNERS (TRIBE)

§ 2.1 The Tribe shall designate a representative (Project Officer) authorized to act on the Tribe's behalf with respect to the Project. The Tribe or such authorized representative shall examine documents submitted by Contractor and shall render decisions in a timely manner and in accordance with the schedule accepted by the Tribe. The Tribe may obtain independent review of the Contract Documents by a separate architect, engineer, contractor, or cost estimator under contract to or employed by the Tribe. Such independent review shall be undertaken at the Tribe's expense in a timely manner and shall not delay the orderly progress of the Work.

§ 2.2 The Tribe shall cooperate with Contractor in securing non-Tribal building and other permits, licenses and inspections. The Tribe shall not be required to pay the fees for such permits, licenses and inspections unless the cost of such fees is excluded from the Contractor's Proposal.

§ 2.3 If the Tribe observes or otherwise becomes aware of a fault or defect in the Work or nonconformity with Contractor's Proposal or Construction Documents, the Tribe shall give prompt written notice thereof to Contractor.

ARTICLE 3 SCOPE OF WORK

§ 3.1 Scope of Work (SOW), this contract shall be intended as the Master Contract for the (project) and there is expected to be multiple tasks for which the Contractor will provide cost estimates as the plans are completed. The Contractor shall provide the expertise and any other resources necessary to complete all tasks and to complete the project, as described in the SCOPE OF WORK, attached hereto and incorporated into this Contract (Attachment A). Contractor shall be currently licensed and bonded as a professional Contractor in the State of Washington and perform the Project in a manner that meets professional standards for a General Contractor in the State of Washington. Contractor shall be solely responsible for the professional quality, technical accuracy, and timely completion of its work. The general location of the property, is at _____ .

ARTICLE 4 TERM OF CONTRACT

Contractor shall begin performance of the project upon award and/or Notice to Proceed, and complete project in phases as detailed in SOW, attached. Any change in performance or services of this Contract shall require a contract amendment/modification, approved by the Tribe. TIME IS OF THE ESSENCE in completion of the Project, and is part of the consideration of the Contract.

Should any additional service be requested that is outside the SCOPE OF WORK, (SOW) those services must be approved in advance in writing by the Tribe and the new time of completion indicated in the amendment/modification will be considered the final due date for completion of the Project.

ARTICLE 5 GENERAL RESPONSIBILITIES OF CONTRACTOR

§5.1 ***Payment of Taxes and Procurement of Tribal Licenses and Permits:*** Contractor shall pay any applicable Tribal, federal, state and local taxes required by law in connection with its performance under this Contract and shall secure all necessary Tribal licenses and permits, paying the fees therefore. As noted above in Article 2.2, the Tribe will cooperate with the Contractor in securing non-Tribal permits, licenses and inspections.

§5.2 ***Compliance with Laws and Regulations*****:** Contractor shall comply with all applicable Tribal, federal, state and local laws and ordinances, rules, regulations and orders relating to the performance of this Contract. If any of the Contract Documents are at variance therewith, the Contractor shall notify the Project Officer promptly upon discovery of such variance.

§5.3 ***Certification of Non-Segregated Facilities:*** By signing this Contract, Contractor certifies that it does not maintain or provide for its employees any segregated facilities at any of Contractor's establishments and that Contractor's employees are not permitted to perform their services at any location, under this Contract, where segregated facilities are maintained. Contractor agrees that failure to abide by this certification is a breach of this Contract.

§5.4 ***Non-Discrimination:*** Contractor agrees to comply with all applicable federal, state, county and local civil rights and human rights laws.

§5.4 ***Responsibility for Negligence of Employees and Subcontractors:*** Contractor assumes full responsibility for the acts, negligence and/or omissions of all of its employees under this contract, for those of its subcontractors and their employees, and for those of all other persons doing work under contract with it. This responsibility specifically extends hereunder to those warranties given by Contractor under Article 10 of the Contract.

§5.5 ***Indemnity and Hold Harmless Agreement:*** Contractor agrees to indemnify and hold harmless the Tribe, and its entities, and the officers, agents and employees of each, from and against all claims, damages, losses and expenses related to or arising from Contractor's services or goods as set out in this Contract. Such expenses include reasonable attorney's fees if it is necessary for the Tribe to commence or defend an action arising out of or associated in any way with Contractor's performance of the Contract. Such claims include, but are not limited to, claims for bodily injury, illness or death, property damage (including loss of use, or other damage) which are caused in whole or in part by any of Contractor's negligent, reckless or intentional acts or omissions, or that of Contractor's subcontractor, or that of anyone employed by them or for whose acts Contractor or Contractor's subcontractor may be liable.

ARTICLE 6 BASIS FOR PAYMENT

§6.1 ***Contract Sum.*** The Tribe shall pay Contractor the Contract Sum in current funds for the Contractor's performance of the Contract.

§6.2 ***Guaranteed Maximum Price.*** The contract sum of the Work to be performed and the Contractor's Fee is guaranteed by the Contractor not to exceed $_____, subject to additions and deductions by Change Order attachment as provided in the Contract Documents. Such maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs that would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Tribe unless a change order applies.

§6.*3* ***Disputed Compensation***. In the event the Tribes dispute the invoice or any portion thereof, the undisputed portion shall be paid to Contractor, based on contractual terms.

ARTICLE 7 CHANGE ORDERS

§7.1 A Change Order (Attachment) is a written instrument prepared by the Contractor and signed by the Tribe and the Contractor, stating their agreement upon all of the following: (1) a change in work scope; (2) the amount of the adjustment, if any, in the Contract Sum; and, (3) the extent of the adjustment, if any, in the Contract Time.

§7.2 No Change Order estimated to result in the Contract Sum exceeding the Guaranteed Maximum Price will be valid without a written instrument signed by the Tribe and the Contractor that formally adjusts the Guaranteed Maximum Price.

ARTICLE 8 PAYMENTS

§8.1 Prior to the first progress payment under this contract, Contractor shall prepare and submit to the Tribe a detailed preliminary breakdown/schedule of values allocated to various portions of the Work, showing the amount included therein for each principal category of the work, which shall substantiate the payment amount

requested in order to provide a basis for determining progress payments. The Tribe shall approve the breakdown. The values and quantities employed in making up this breakdown are for determining the amount of progress payments and shall not be construed as a basis for additions to or deductions from the contract price.

§8.2 The Contractor shall submit applications for payments on or before the 5th day of the month for operations completed in accordance with the current schedule of values. Applications for payment shall clearly detail total project cost, work performed to date, and amount of current draw. The Tribe shall pay Contractor on the application for payment within 30 days of receipt for work performed which meets the standards of quality established under the contract, as approved by the Tribe. All amounts owed to the Contractor shall be due and payable upon Substantial Completion.

§8.3 "Substantial Completion." Substantial Completion means the state in progress of the Work that is sufficiently complete so Tribe can occupy or utilize the Work for its intended purpose. Contractor shall notify the Tribe when Work or an agreed portion thereof is substantially completed, by issuing a Certificate of Substantial Completion. Upon Substantial Completion, the Tribe and Contractor shall agree on a punch list of Work yet to be completed and Contractor shall proceed diligently to complete such unfinished Work. Final payment request shall be submitted to:

STILLAGUAMISH TRIBE OF INDIANS
Attention:
P. O. Box 277
Arlington, WA 98223-0277

§8.4 Along with each request for progress payments and the required estimates, the Contractor shall furnish the following certification, or payment shall not be made:

I hereby certify, to the best of my knowledge and belief, that:
(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements; and,
(3) This request for progress payments does not include any amounts that the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract.

_____
Name:

_____
Title:

_____
Date:

§8.5 Except as otherwise provided in applicable law, the Tribe shall retain five percent (5%) of the amount of progress payments until completion and acceptance of all Work under the contract. Upon final acceptance of the work the Contractor shall submit final invoice for retainage.

§8.6 All material and Work covered by progress payments made shall, at the time of payment become the sole property of the Tribe, but this shall not be construed as (1) relieving the Contractor from the sole responsibility for all material and Work upon which payments have been made or the restoration of any damaged Work; or, (2) waiving the right of the Tribe to require the fulfillment of all of the terms of the contract. In the event the Work of the Contractor has been damaged by other contractors or persons other than employees of the Tribe in the course of their employment, the Contractor shall restore such damaged Work without cost to the Tribe and seek redress for its damage only from those who directly caused it.

§8.7 The Tribe shall make the final payment due the Contractor under this contract after (1) completion and final acceptance of all Work; and (2) presentation of written release of all claims against the Tribe arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. Each such exception shall embrace no more than one claim, the basis and scope of which shall be clearly defined. The amounts for such excepted claims shall not be included in the request for final payment.

§8.8 Prior to making any payment, the Tribe may require the Contractor to furnish receipts or other evidence of payment from all persons performing Work and supplying material to the Contractor, if the Tribe determines such evidence is necessary to substantiate claimed costs.

§ 8.9 The Tribe shall not (1) determine or adjust any claims for payment or disputes arising thereunder between the Contractor and its subcontractors or material suppliers; or, (2) withhold any moneys for the protection of the subcontractors or material suppliers. The failure or refusal of the Tribe to withhold moneys from the Contractor shall in no wise impair the obligations of any surety or sureties under any bonds furnished under this contract.

ARTICLE 9 ACCOUNTING RECORDS

§9.1 Contractor shall keep full and detailed accounts and exercise such controls as may be necessary for proper financial management under this Contract, and the accounting and control systems shall be satisfactory to the Tribe. The Tribe's accountants shall be afforded access to, and shall be permitted to audit and copy, Contractor's records, books, correspondence, instructions, drawings, receipts, subcontracts, purchase orders, vouchers, memoranda and other data relating to this Contract, and Contractor shall preserve these for a period of three years after final payment, or for such longer period as may be required by law.

§9.2 The Tribe or authorized representatives shall, until three (3) years after final payment under this contract, have access to and the right to examine any of Contractor’s directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, and transcriptions.

ARTICLE 10 WARRANTIES

§10.1 In addition to any other warranties in this contract, the Contractor warrants that any services and/or goods provided under this contract are of good quality, conform- to the contract requirements and are free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. It is understood between the parties hereto that any and all goods and services that are not so in conformity are

defective. This warranty shall continue for a period of two years from the date of final acceptance of the Work. All warranties given under this Article specifically incorporate Contractor's responsibilities for employees and subcontractors under Article 5, Section 5.4 of this Contract.

§10.2 The Contractor shall remedy, at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to Tribe-owned or controlled real or personal property when the damage is the result of: (1) The Contractor's negligence, intentional acts, omissions or failure to conform to contract requirements; or (2) Any defects of equipment, material, workmanship or design furnished by the Contractor.

§10.3 The Contractor shall restore any Work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to Work repaired or replaced will run for two years from the date of repair or replacement.

§10.4 The Tribe shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defects or damage.

§10.5 If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Tribe shall have the right to replace, repair or otherwise remedy the failure, defect, or damage at the Contractor's expense.

§10.6 With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for Work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed in writing, for the benefit of the Tribe; and, (3) Enforce all warranties for the benefit of the Tribe.

§10.7 In the event the Contractor's warranty under § 10.1 of this clause has expired, the Tribe may bring suit at its own expense to enforce a subcontractor's, manufacturer's or supplier's warranty.

§10.8 Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defect of material or design furnished by the Tribe nor for the repair of any damage that results from any defect in Tribe furnished material or design.

§10.9 Notwithstanding any provisions herein to the contrary, the establishment of the time periods in paragraphs §10.1 and § 10.3 above relate only to the specific obligation of the Contractor to correct the work, and have no relationship to the time within which its obligation to comply with the contract may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligation other than specifically to correct the Work.

§10.10 This warranty shall not limit the Tribe's rights under the Inspection and Acceptance of Construction Article 11, Section 11.10 of this Contract with respect to latent defects, gross mistakes or fraud.

ARTICLE 11 INSPECTIONS AND ACCEPTANCE OF CONSTRUCTION

§11.1 Definitions. As used in this clause:

(1) "***Acceptance***" means the act of an authorized representative of the Tribe by which the Tribe approves and assumes ownership of the Work performed under this Contract. Acceptance may be partial or complete.

(2) "***Inspection***" means examining and testing the Work performed under the Contract (including, when appropriate, raw materials, equipment, components, and intermediate assemblies) to determine whether it conforms to Contract requirements.

(3) "***Testing***" means that element of inspection that determines the properties or elements, including functional operation of materials, equipment, or their components, by the application of established scientific principles and procedures.

§11.2 Contractor shall maintain an adequate inspection system and perform such inspections as will ensure the work performed under the contract conforms to contract requirements. All Work is subject to Tribal inspection at reasonable times before acceptance to ensure strict compliance with the terms of the Contract.

§11.3 Tribal inspections and tests are for the sole benefit of the Tribe and do not relieve the Contractor of responsibility for providing adequate quality control measures.

§11.4 The presence or absence of Tribe's inspector does not relieve the Contractor from any Contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the Tribe's written authorization. The Tribe shall give all instructions and approvals with respect to the work to the Contractor.

§11.5 Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing safe and convenient inspections and tests as may be required by Tribe. Tribe may charge to Contractor any additional cost of inspection or test when Work is not ready at time specified by Contractor for inspection/test, or when prior rejection makes re-inspection or retest necessary. Tribe shall perform all inspections and tests in a manner that will not unnecessarily delay Work.

§11.6 The Tribe may conduct routine inspections of the construction site on a daily basis.

§11.7 Contractor shall, without charge, replace or correct Work found by the Tribe not to conform to contract requirements, unless the Tribe decides that it is in its interest to accept the Work with an appropriate adjustment in contract price. Contractor shall promptly segregate and remove rejected material from the premises.

§11.8 If Contractor does not promptly replace or correct rejected Work, the Tribe may by contract or otherwise, replace or correct the Work and charge the cost to Contractor, or terminate for default Contractor's right to proceed.

§11.9 If any Work requiring inspection is covered up without approval of the Tribe, it must be, if requested by the Tribe, uncovered at the expense of Contractor. If at any time before final acceptance of the entire Work, the Tribe

considers it necessary or advisable to examine Work already completed by removing or tearing it out, Contractor, shall on request, promptly furnish all necessary facilities, labor, and material. If such Work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, Contractor shall defray all the expenses of the examination and of satisfactory reconstruction. If, however, such Work is found to meet the requirements of the Contract, the Tribe shall make an equitable adjustment to cover the cost of the examination and reconstruction, including, if completion of the Work was thereby delayed, an extension of time.

§11.10 Contractor shall notify the Tribe, in writing, as to the date when in its opinion all or a designated portion of the Work will be substantially completed and ready for inspection. Unless otherwise specified in the Contract, the Tribe shall accept, as soon as practicable after completion and inspection, all Work required by the Contract or that portion of the Work the Tribe determines and designates can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Tribe's right under any warranty or guarantee.

ARTICLE 12 LIQUIDATED DAMAGES FOR DELAY

Solely for any delay caused by Contractor in achieving Substantial Completion of the Work, Contractor shall pay the Tribe the sum of $300 per calendar day, as liquidated damages, until such time Work is completed and accepted.

ARTICLE 13 INDEPENDENT CONTRACTOR

Contractor is retained as an independent contractor, not employee or agent of the Tribe and shall be responsible for its own Work. Contractor and its employees and/or subcontractors shall not be eligible for any benefit available to Tribal employees, including, but not limited to, workers compensation insurance, state disability insurance, unemployment insurance, health and life insurance, vacation or sick leave, bonus, pension or savings plans, and the like. No income, social security, state disability or other federal or state payroll tax will be deducted from payments made to Contractor, employees or subcontractors under this Contract. Contractor agrees to pay all state and federal taxes and other levies and charges when due on account of monies paid to Contractor and to defend, indemnify and hold the Tribe harmless from and against any and all liability resulting from failure to do so.

ARTICLE 14 NO PARTNERSHIP

This Contract does not create a partnership relationship. Contractor does not have authority to enter into contracts on the Tribe's behalf.

ARTICLE 15 PROJECT COORDINATION AND NOTICES

Day-to-day project coordination and communications shall be conducted between the Tribal Project Officer (PO) and the Contractor's Project Manager as designated below. The Contractor's Project Manager is the Contractor's representative for this Contract, and shall be responsible for the performance of this Contract, and shall have signature authority for the Contractor for all matters related to this Contract. All notices of other communications to either party shall be deemed given when made in writing and personally delivered, faxed, or mailed, postage paid, to:

STILLAGUAMISH TRIBE OF INDIANS
Project Officer (PO) _____
P. O. Box 277
Arlington, WA 98223-0277
Ph (360) 652-7362
Fax (360) 659-3113

Bidder
__
_____
_____
Ph (xxx) xxx-xxxx

ARTICLE 16 INSURANCE AND INDEMNIFICATION

A. Insurance Required

CONTRACTOR shall, at all times during the term of this Contract and extended terms thereof, be BONDED and provide and maintain at its own expense, the following types of insurance protecting the interests of the Tribe, with limits of liability not less than those specified below:

1. Workers' Compensation Insurance as statutorily required, insuring against any and all claims of workers for compensation arising out of workers' compensation claims.
2. Commercial General Liability Insurance in amounts not less than $1,000,000, one million dollars, each occurrence, Combined Single Limit for Bodily Injury and Property Damage. The Contractor shall name the Tribe as an additional insured.
3. Automobile Liability Insurance in an amount not less than $1,000,000, one million dollars, for any hired, owned, or non-owned vehicles used in performance of the work.
4. Professional Liability Insurance in amounts not less than $1,000,000, one million dollars, insuring CONTRACTOR for professional errors/omissions in the performance of work under this Contract.

B. Certification of Insurance

CONTRACTOR shall provide Certificates of Insurance in form and content satisfactory to the Tribe, evidencing all coverage stated above. The Tribe shall be a named insured under the certificate of Insurance.

C. Notice of Cancellation

Policies and/or certificates must specifically provide to the Tribe a thirty-day written notice of cancellation, nonrenewal, or material change.

ARTICLE 17 SUBCONTRACTING

Contractor shall have the authority to engage subcontractors for portions of the Work as Contractor wishes to complete the Work. The Contractor shall notify the Tribe of any subcontractors used in the performance of the Work. The Tribe shall communicate with subcontractors through Contractor. Contractor retains full responsibility under this Contract as outlined in Article 5, Section 5.4 above.

ARTICLE 18 CONFIDENTIALITY

Contractor shall not disclose or permit the disclosure of any documents or records which contain Confidential Information, whether labeled this way or not, (information not generally available to the public) provided to Contractor by the Tribe, except to its agents, employees, and consultants who need such confidential information in order to properly perform their duties under this Contract.

ARTICLE 19 OWNERSHIP OF DOCUMENTS

CONTRACTOR agrees that all documents, reports, materials, or other subject matter prepared, procured, or produced in the rendition of services under this Contract shall become the exclusive property of the Tribe upon payment for services rendered hereunder; and all such documents, reports, materials, or other subject matter shall be delivered to the Tribe as specified in this Contract or upon any termination thereof.

ARTICLE 20 CONFLICT OF INTEREST

Contractor covenants that it presently has no interest, and shall not have any interest, direct or indirect, which would conflict in any manner with the performance of services required under this Contract.

ARTICLE 21 COMPLIANCE WITH LAW

A. Generally.
CONTRACTOR agrees to comply with any and all applicable state, local and tribal laws and regulations in the performance of any Work related to this Project.

B. Other Requirements.
CONTRACTOR agrees to comply with all applicable requirements of the federal regulations relating to contracting, found at 24 Code of Federal Register Part 1000.16 and Part 85. To the extent that they may apply to CONTRACTOR, these requirements include:

1. Nondiscrimination requirements under 24 CFR Section 1000.12;
2. Labor standards under 24 CFR Section 1000.16 and title 29 CFR Parts 1,3,5 and 7 (“Davis Bacon”) if Federally Funded project;
3. Environmental review requirements under 24 CFR Section 1000.18;
4. Administrative requirements as listed in 24 CFR Section 1000.26;
5. Conflict of interest provisions under 24 CFR Section 1000.30 and Part 85.36;
6. Prohibitions in 24 CFR Part 24 with regard to the use of debarred, suspended, or ineligible contractors, see 24 CFR Section 1000.44;
7. The Drug-Free Workplace Act of 1988;
8. The Indian preference requirements pursuant to Section 7(b) of the Indian Self-Determination and Education Assistance Act, 25 USC 450 (e) (b), see 24 CFR Section 1000.48; and
9. All other applicable portions of 24 CFR Part 1000, and all other applicable laws and regulations.

ARTICLE 22 AUDITS AND RETENTION OF RECORDS

Contractor shall permit access by the Tribe to any books, documents, papers, and records of the Contractor that are directly pertinent to this Contract for the purpose of making audits, examination, excerpts, and transcriptions. Contractor agrees to retain all required records for three years after the Tribe has made final payment under this Contract and all other pending matters are closed.

ARTICLE 23 SUSPENSIONS

The Tribe may give written notice to Contractor to suspend Work on the project or any part thereof. The Tribe shall not be obligated to consider a claim for additional compensation if Contractor is given written notice to resume Work within 120 calendar days. If notice to resume Work is not given within 120 calendar days, Contractor shall be entitled to an equitable adjustment in compensation.

ARTICLE 24 RESOLUTION OF DISPUTES

In the event of a dispute arising under this Contract, Contractor shall notify the Tribal PO promptly in writing. The Tribe shall respond to the complaint in writing in a timely manner. Contractor and the Tribe agree to meet in person and to cooperate in good faith to attempt to resolve any controversy or claim arising out of or relating to this Contract. This Contract has been and shall be construed as having been made and delivered to the Stillaguamish Tribe of Indians, and it is mutually understood and agreed by each party hereto that this Contract shall be governed by the laws of the Stillaguamish Tribe of Indians, both as to interpretation and performance, unless Tribal law conflicts with Federal law, in which case Federal law will apply. In the event that the parties are unable to resolve the dispute informally, the parties agree to submit the dispute to mediation before a mutually agreed- upon mediator, each party to share equally in the costs of the mediation.

ARTICLE 25 TERMINATION

The Tribe may terminate this Contract at any time for its convenience, or for failure of Contractor to fulfill its obligations under this Contract. The Tribe shall terminate by delivering to Contractor a Notice of Termination specifying the reason therefore and the effective date of termination. In the case of the Tribe's proposed termination for breach under this Contract, the Contractor and the Tribe may negotiate a reasonable period for cure. Upon the effective date of termination, the Contractor shall immediately discontinue all services and deliver to the Tribe all information and records accumulated or generated in performing this Contract, whether completed or in process. If the termination is for convenience of the Tribe, the Tribe shall be liable only for payment for accepted services rendered before the date of termination.

ARTICLE 26 SOVEREIGN IMMUNITY

Nothing in this Agreement or any actions taken by the Stillaguamish Tribe of Indians under this Agreement shall constitute or be construed, in any way, as a waiver or diminishment of the sovereign immunity of the Stillaguamish Tribe of Indians, or its enterprises, agents or employees.

ARTICLE 26 EXTENT OF CONTRACT

The entire Contract between the Tribe and Contractor is comprised of multiple documents, including all appendices and attachments to this CONTRACT FOR GENERAL CONTRACTOR SERVICES, namely the REQUEST FOR BIDS, SCOPE OF WORK (Attachment A), RATE SCHEDULE (Attachment B), BID OFFER SHEET (Attachment C), BID ACCEPTANCE/CONTRACT AWARD (Attachment D), and if submitted, INDIAN ENTERPRISE QUALIFICICATION STATEMENT (Attachment E) CHANGE ORDER (Attachment F) and any forms provided by the Tribe for use in the completion of this Contract . All such documents constitute the entire and integrated Contract between the Tribe and Contractor and supersede all prior negotiations, representations or agreements, either written or oral. This Contract may be amended only by written instrument signed by both

the Tribe and Contractor. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral.

ARTICLE 27 SEVERABILITY

If any term, covenant, or condition of this Contract is held by a court of competent jurisdiction to be invalid or unenforceable, the remainder of this Contract shall remain in effect.

ARTICLE 28 EXECUTION

(Check applicable provision.)

___X_ The parties agree that this Contract will be considered signed when the signature of a party is delivered by facsimile or electronic transmission. Signatures transmitted by facsimile or electronic transmission shall have the same effect as original signatures.

OR

_____This Contract shall be executed in duplicate originals, with each party retaining one fully executed duplicate original of the Contract.

IN WITNESS WHEREOF, the parties hereto have executed this Contract as of _____

STILLAGUAMISH TRIBE OF INDIANS	**Bidder**
By: Signature: _____ Title: Executive Director Date: _____	By: Signature: _____ Title: _____ Date: _____ Email: _____ Taxpayer ID: _____

SECTION IV – SPECIAL PROVISIONS

SPECIAL PROVISIONS

APPENDIX A CONTRACT PLANS

APPENDIX B TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) AND CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (CSWPPP)

APPENDIX C CULTURAL RESOURCES REPORT, MONITORING AND INADVERTENT DISCOVERY PLAN

APPENDIX D GEOTECHNICAL REPORT

APPENDIX E PERMITS

APPENDIX F STANDARD PLANS

SPECIAL PROVISION SPECIFICATIONS

KACKMAN CREEK CULVERT REPLACEMENT WITH A NEW 110-FOOT BRIDGE AT 55TH AVE NE

Stillaguamish Tribe of Indians

STILLAGUAMISH
stuləgʷa'bš
VILLAGE

February 7, 2020

Prepared by:

Herrera Environmental Consultants Inc.
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121

Note:
Some pages in this document have been purposely skipped or blank pages inserted so that this document will copy correctly when duplexed.

KACKMAN CREEK CULVERT REPLACEMENT WITH A NEW 110 FT BRIDGE AT 55TH AVE NE

SPECIAL PROVISIONS SPECIFICATIONS

CERTIFICATION

I hereby certify that these contract documents were prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer under the laws of the State of Washington.

Ian Mostrenko, P.E. Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Seattle, WA 98121 Sections: 2-01, 2-03, 2-05, 2-09, 8-01, 8-05, 9-13, 9-14.1, 9-14.6, 9-37, 9-38 Associate Engineer for Stream, Bank, Log Structure designs, and responsible for associated sections of this document.	
Kate Forester, P.L.A. Herrera Environmental Consultants 1001 SE Water Avenue Suite 290 Portland, OR 97214 Sections: 2.01, 2.03.2, 2-03.3(5)A, 8-02, 9-14.2, 9-14.5 Landscape Architect for planting plan buffer mitigation designs, and responsible for associated sections of this document.	

KACKMAN CREEK CULVERT REPLACEMENT WITH A NEW 110 FT BRIDGE AT 55TH AVE NE

SPECIAL PROVISIONS SPECIFICATIONS

CERTIFICATION

I hereby certify that these contract documents were prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer under the laws of the State of Washington.

Pei-Chi S. Shih, P.E. TranTech Engineering, LLC 365 – 118th Ave SE, Suite 100 Bellevue, WA 98005 Sections: 6-02.4, 6-02.5, 6-05.3(10), 6-06.3(2), 6-06.5, 6-20 Project Structural Engineer for Bridge and Wall design, and responsible for associated sections of this document.	PEI-CHI SCOTT SHIH STATE OF WASHINGTON 25583 REGISTERED PROFESSIONAL ENGINEER Pei-Chi Scott Shih 2/3/2020 EXPIRES 3/12/2021
Thomas M Weller, P.E. TranTech Engineering, LLC 1221 Fraser Street, Suite E-3 Bellingham, WA 98229 Sections: 1-02.6, 1-04.4(1), 1-05.4, 1-05.16, 1-05.18, 1-07.6, 1-07.17, 1-07.23, 1-08.0, 1-08.3, 1-08.4, 1-09.6, 1-10, 2-02, 2-03.3(7), 2-03.3(14)C, 2-03.4, 5-04.2(2), 5-04.3(1), 5-04.3(3)D, 7-04.4, 7-04.5, 8-01.4(3) Senior Civil Engineer for Stormwater and Roadway design, and responsible for associated sections of this document.	THOMAS M. WELLER STATE OF WASHINGTON 36669 REGISTERED PROFESSIONAL ENGINEER 2/3/2020

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INTRODUCTION

The following Amendments and Special Provisions shall be used in conjunction with the 2020 Standard Specifications for Road, Bridge, and Municipal Construction.

AMENDMENTS TO THE STANDARD SPECIFICATIONS

The following Amendments to the Standard Specifications are made a part of this contract and supersede any conflicting provisions of the Standard Specifications. For informational purposes, the date following each Amendment title indicates the implementation date of the Amendment or the latest date of revision.

Each Amendment contains all current revisions to the applicable section of the Standard Specifications and may include references which do not apply to this particular project.

Several types of Special Provisions and Amendments to the Standard Specifications are included in this contract; General, Region, Bridges and Structures, and Project Specific. Special Provisions types are differentiated as follows:

(date)	General Special Provision
(******)	Notes a revision to a General Special Provision and also notes a Project Specific Special Provision.
(Regions[1] date)	Region Special Provision

General Special Provisions are similar to Standard Specifications in that they typically apply to many projects, usually in more than one Region. Usually, the only difference from one project to another is the inclusion of variable project data, inserted as a “fill-in”.

Region Special Provisions are commonly applicable within the designated Region. Region designations are as follows:

Regions[1]	
ER	Eastern Region
NCR	North Central Region
NWR	Northwest Region
OR	Olympic Region
SCR	South Central Region
SWR	Southwest Region
WSF	Washington State Ferries Division

Project Specific Special Provisions normally appear only in the contract for which they were developed.

Division 1
General Requirements

Definitions

Section 1-01.3 is supplemented with the following:

(******)

Biologist – Shall consist of a biologist from the Contracting Agency Natural Resources Department.

Contract Documents - Shall consist of the following, and in case of conflicting provisions, the first mentioned shall have precedence.

- Change Orders after the Contract Form/Agreement Form is Signed
- Addenda
- Contract Form/Agreement Form
- Detail Drawings and Written Instructions
- Measurement and Payment
- Special Contract Information
- Contract Plans
- General Conditions
- Special Provisions
- Reference Specifications
- Instructions to Bidders
- Proposal
- Performance bond
- Payment bond

Owner - The Contracting Agency or entity that is a part of this contract, contracting under the official name set forth in the Contract Form/Agreement Form.

Landscape Architect - shall be the Landscape Architect of record for the Contract Plans.

Owner's Representative or **Project Officer** - The designated representative of the Owner or Contracting Agency authorized to act on the behalf of the Owner or Contracting Agency with respect to the Project.

Contract Specifications or **Specifications** - Shall mean the prescribed directions, requirements, explanations, terms and provisions pertaining to the various features of the work to be done, or manner and method of performance, and the manner and method of measurements and payments. They also include directions, requirements, and explanations as set forth on the Plans.

Standard Specifications - Whenever reference is made to "Standard Specifications", it shall mean the latest edition of the W.S.D.O.T. "Standard Specifications for Road, Bridge and Municipal Construction."

Bid Procedures and Conditions

Preparation of Proposal

(July 11, 2018 APWA GSP)

The second paragraph of Section 1-02.6 is supplemented with the following:

(******)

4. If a minimum bid amount has been established for any item, the unit or lump sum price must equal or exceed the minimum amount stated.

5. Any correction to a bid made by interlineation, alteration, or erasure, shall be initialed by the signer of the bid.

The last two paragraphs of Section 1-02.6 are deleted, and replaced with the following:

(******)

If no Subcontractor is listed, the Bidder acknowledges that it does not intend to use any Subcontractor to perform those items of work.

The Bidder shall submit with their Bid a completed Contractor Certification Wage Law Compliance form, provided by the Contracting Agency. Failure to return this certification as part of the Bid Proposal package will make this Bid Nonresponsive and ineligible for Award. A Contractor Certification of Wage Law Compliance form is included in the Proposal Forms.

The Bidder shall make no stipulation on the Bid Form, nor qualify the bid in any manner.

A bid by a corporation shall be executed in the corporate name, by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign).

A bid by a partnership shall be executed in the partnership name, and signed by a partner. A copy of the partnership agreement shall be submitted with the Bid Form if any UDBE requirements are to be satisfied through such an agreement.

A bid by a joint venture shall be executed in the joint venture name and signed by a member of the joint venture. A copy of the joint venture agreement shall be submitted with the Bid Form if any UDBE requirements are to be satisfied through such an agreement.

Section 1-02.6 is supplemented with the following:

(******)

(January 7, 2019)

Progress Schedule Minimum Bid

A minimum bid of *** $5,500 *** lump sum has been established for the item “Min Bid Req - Type *** B *** Progress Schedule *** $5,500 ***.” The Contractor’s bid shall equal or exceed that amount. If the Contractor’s bid is less than the minimum specified amount, the Contracting Agency will unilaterally revise the bid amount to the minimum specified amount and recalculate the Contractor’s total bid amount. The corrected total bid amount will be used by the Contracting Agency for award purposes and to fix the amount of the contract bond.

Scope of the Work

Changes

Minor Changes
(May 30, 2019 APWA GSP)

The first paragraph of Section 1-04.4(1) is deleted and replaced with the following:

(******)

Payments or credits for changes amounting to $20,000 or less may be made under the Bid item “Minor Change”. At the discretion of the Contracting Agency, this procedure for Minor Changes may be used in lieu of the more formal procedure as outlined in Section 1-04.4, Changes. All “Minor Change” work will be within the scope of the Contract Work and will not change Contract Time.

Control of Work

Conformity with and Deviations From Plans and Stakes

(August 7, 2017)
Contractor Surveying - Structure

Copies of the Contracting Agency provided primary survey control data are available for the bidder's inspection at the office of the Engineer.

The Contractor shall be responsible for setting, maintaining, and resetting all alignment stakes, slope stakes, and grades necessary for the construction of bridges, noise walls, and retaining walls. Except for the survey control data to be furnished by the Contracting Agency, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility.

The Contractor shall inform the Engineer when monuments are discovered that were not identified in the Plans and construction activity may disturb or damage the monuments. All monuments noted on the plans “DO NOT DISTURB” shall be protected throughout the length of the project or be replaced at the Contractors expense.

Detailed survey records shall be maintained, including a description of the work performed on each shift, the methods utilized, and the control points used. The record shall be adequate to allow the survey to be reproduced. A copy of each day's record shall be provided to the Engineer within three working days after the end of the shift.

The meaning of words and terms used in this provision shall be as listed in "Definitions of Surveying and Associated Terms" current edition, published by the American Congress on Surveying and Mapping and the American Society of Civil Engineers.

The survey work by the Contractor shall include but not be limited to the following:

1. Verify the primary horizontal and vertical control furnished by the Contracting Agency, and expand into secondary control by adding stakes and hubs as well as additional survey control needed for the project. Provide descriptions of

secondary control to the Contracting Agency. The description shall include coordinates and elevations of all secondary control points.

2. Establish, by placing hubs and/or marked stakes, the location with offsets of foundation shafts and piles.

3. Establish offsets to footing centerline of bearing for structure excavation.

4. Establish offsets to footing centerline of bearing for footing forms.

5. Establish wing wall, retaining wall, and noise wall horizontal alignment.

6. Establish retaining wall top of wall profile grade.

7. Establish elevation benchmarks for all substructure formwork.

8. Check elevations at top of footing concrete line inside footing formwork immediately prior to concrete placement.

9. Check column location and pier centerline of bearing at top of footing immediately prior to concrete placement.

10. Establish location and plumbness of column forms, and monitor column plumbness during concrete placement.

11. Establish pier cap and crossbeam top and bottom elevations and centerline of bearing.

12. Check pier cap and crossbeam top and bottom elevations and centerline of bearing prior to and during concrete placement.

13. Establish grout pad locations and elevations.

14. Establish structure bearing locations and elevations, including locations of anchor bolt assemblies.

15. Establish box girder bottom slab grades and locations.

16. Establish girder and/or web wall profiles and locations.

17. Establish diaphragm locations and centerline of bearing.

18. Establish roadway slab alignment, grades and provide dimensions from top of girder to top of roadway slab. Set elevations for deck paving machine rails.

19. Establish traffic barrier and curb profile.

20. Profile all girders prior to the placement of any deadload or construction live load that may affect the girder's profile.

The Contractor shall provide the Contracting Agency copies of any calculations and staking data when requested by the Engineer.

To facilitate the establishment of these lines and elevations, the Contracting Agency will provide the Contractor with the following primary survey and control information:

1. Descriptions of two primary control points used for the horizontal and vertical control. Primary control points will be described by reference to the project alignment and the coordinate system and elevation datum utilized by the project. In addition, the Contracting Agency will supply horizontal coordinates for the beginning and ending points and for each Point of Intersection (PI) on each alignment included in the project.

2. Horizontal coordinates for the centerline of each bridge pier.

3. Computed elevations at top of bridge roadway decks at one-tenth points along centerline of each girder web. All form grades and other working grades shall be calculated by the Contractor.

The Contractor shall give the Contracting Agency three weeks notification to allow adequate time to provide the data outlined in Items 2 and 3 above. The Contractor shall ensure a surveying accuracy within the following tolerances:

	Vertical	Horizontal
1. Stationing on structures		±0.02 feet
2. Alignment on structures		±0.02 feet
3. Superstructure elevations	±0.01 feet variation from plan elevation	
4. Substructure	±0.02 feet variation from Plan grades.	

The Contracting Agency may spot-check the Contractor's surveying. These spot-checks will not change the requirements for normal checking by the Contractor.

When staking the following items, the Contractor shall perform independent checks from different secondary control to ensure that the points staked for these items are within the specified survey accuracy tolerances:

Piles
Shafts
Footings
Columns

The Contractor shall calculate coordinates for the points associated with piles, shafts, footings and columns. The Contracting Agency will verify these coordinates prior to issuing approval to the Contractor for commencing with the survey work. The Contracting Agency will require up to seven calendar days from the date the data is received to issuing approval.

Contract work to be performed using contractor-provided stakes shall not begin until the stakes are approved by the Contracting Agency. Such approval shall not relieve the Contractor of responsibility for the accuracy of the stakes.

Payment

Payment will be made for the following bid item when included in the proposal:

"Structure Surveying", lump sum.

The lump sum contract price for "Structure Surveying" shall be full pay for all labor, equipment, materials, and supervision utilized to perform the Work specified, including any resurveying, checking, correction of errors, replacement of missing or damaged stakes, and coordination efforts.

(August 7, 2017)
Contractor Surveying - Roadway

Copies of the Contracting Agency provided primary survey control data are available for the bidder's inspection at the office of the Engineer.

The Contractor shall be responsible for setting, maintaining, and resetting all alignment stakes, slope stakes, and grades necessary for the construction of the roadbed, drainage, surfacing, paving, channelization and pavement marking, illumination and signals, guardrails and barriers, and signing. Except for the survey control data to be furnished by the Contracting Agency, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility.

The Contractor shall inform the Engineer when monuments are discovered that were not identified in the Plans and construction activity may disturb or damage the monuments. All monuments noted on the plans “DO NOT DISTURB” shall be protected throughout the length of the project or be replaced at the Contractors expense.

Detailed survey records shall be maintained, including a description of the work performed on each shift, the methods utilized, and the control points used. The record shall be adequate to allow the survey to be reproduced. A copy of each day's record shall be provided to the Engineer within three working days after the end of the shift.

The meaning of words and terms used in this provision shall be as listed in "Definitions of Surveying and Associated Terms" current edition, published by the American Congress on Surveying and Mapping and the American Society of Civil Engineers.

The survey work shall include but not be limited to the following:

1. Verify the primary horizontal and vertical control furnished by the Contracting Agency, and expand into secondary control by adding stakes and hubs as well as additional survey control needed for the project. Provide descriptions of secondary control to the Contracting Agency. The description shall include coordinates and elevations of all secondary control points.

2. Establish, the centerlines of all alignments, by placing hubs, stakes, or marks on centerline or on offsets to centerline at all curve points (PCs, PTs, and PIs) and at points on the alignments spaced no further than 50 feet.

3. Establish clearing limits, placing stakes at all angle points and at intermediate points not more than 50 feet apart. The clearing and grubbing limits shall be 5

feet beyond the toe of a fill and 10 feet beyond the top of a cut unless otherwise shown in the Plans.

4. Establish grading limits, placing slope stakes at centerline increments not more than 50 feet apart. Establish offset reference to all slope stakes. If Global Positioning Satellite (GPS) Machine Controls are used to provide grade control, then slope stakes may be omitted at the discretion of the Contractor

5. Establish the horizontal and vertical location of all drainage features, placing offset stakes to all drainage structures and to pipes at a horizontal interval not greater than 25 feet.

6. Establish roadbed and surfacing elevations by placing stakes at the top of subgrade and at the top of each course of surfacing. Subgrade and surfacing stakes shall be set at horizontal intervals not greater than 50 feet in tangent sections, 25 feet in curve sections with a radius less than 300 feet, and at 10-foot intervals in intersection radii with a radius less than 10 feet. Transversely, stakes shall be placed at all locations where the roadway slope changes and at additional points such that the transverse spacing of stakes is not more than 12 feet. If GPS Machine Controls are used to provide grade control, then roadbed and surfacing stakes may be omitted at the discretion of the Contractor.

7. Establish intermediate elevation benchmarks as needed to check work throughout the project.

8. Provide references for paving pins at 25-foot intervals or provide simultaneous surveying to establish location and elevation of paving pins as they are being placed.

9. For all other types of construction included in this provision, (including but not limited to channelization and pavement marking, illumination and signals, guardrails and barriers, and signing) provide staking and layout as necessary to adequately locate, construct, and check the specific construction activity.

10. Contractor shall determine if changes are needed to the profiles or roadway sections shown in the Contract Plans in order to achieve proper smoothness and drainage where matching into existing features, such as a smooth transition from new pavement to existing pavement. The Contractor shall submit these changes to the Engineer for review and approval 10 days prior to the beginning of work.

The Contractor shall provide the Contracting Agency copies of any calculations and staking data when requested by the Engineer.

To facilitate the establishment of these lines and elevations, the Contracting Agency will provide the Contractor with primary survey control information consisting of descriptions of two primary control points used for the horizontal and vertical control, and descriptions of two additional primary control points for every additional three miles of project length. Primary control points will be described by reference to the project alignment and the coordinate system and elevation datum utilized by the project. In addition, the Contracting Agency will supply horizontal coordinates for the beginning

and ending points and for each Point of Intersection (PI) on each alignment included in the project.

The Contractor shall ensure a surveying accuracy within the following tolerances:

	Vertical	Horizontal
Slope stakes	±0.10 feet	±0.10 feet
Subgrade grade stakes set 0.04 feet below grade	±0.01 feet	±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)
Stationing on roadway	N/A	±0.1 feet
Alignment on roadway	N/A	±0.04 feet
Surfacing grade stakes	±0.01 feet	±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)
Roadway paving pins for surfacing or paving	±0.01 feet	±0.2 feet (parallel to alignment) ±0.1 feet (normal to alignment)

The Contracting Agency may spot-check the Contractor's surveying. These spot-checks will not change the requirements for normal checking by the Contractor.

When staking roadway alignment and stationing, the Contractor shall perform independent checks from different secondary control to ensure that the points staked are within the specified survey accuracy tolerances.

The Contractor shall calculate coordinates for the alignment. The Contracting Agency will verify these coordinates prior to issuing approval to the Contractor for commencing with the work. The Contracting Agency will require up to seven calendar days from the date the data is received.

Contract work to be performed using contractor-provided stakes shall not begin until the stakes are approved by the Contracting Agency. Such approval shall not relieve the Contractor of responsibility for the accuracy of the stakes.

Stakes shall be marked in accordance with Standard Plan A10.10. When stakes are needed that are not described in the Plans, then those stakes shall be marked, at no additional cost to the Contracting Agency as ordered by the Engineer.

Payment

Payment will be made for the following bid item when included in the proposal:

"Roadway Surveying", lump sum.

The lump sum contract price for "Roadway Surveying" shall be full pay for all labor, equipment, materials, and supervision utilized to perform the Work specified, including any resurveying, checking, correction of errors, replacement of missing or damaged stakes, and coordination efforts.

(August 7, 2017)

Contractor Surveying - Restoration

Copies of the Contracting Agency provided primary survey control data are available for the bidder's inspection at the office of the Engineer.

The Contractor shall be responsible for setting, maintaining, and resetting all alignment stakes, slope stakes, and grades necessary for the construction of the stream channel, stream banks, and log structures, as well as for the seeding, planting, and mitigation areas. Except for the survey control data to be furnished by the Contracting Agency, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility.

The Contractor shall inform the Engineer when monuments are discovered that were not identified in the Plans and construction activity may disturb or damage the monuments. All monuments noted on the plans “DO NOT DISTURB” shall be protected throughout the length of the project or be replaced at the Contractors expense.

Detailed survey records shall be maintained, including a description of the work performed on each shift, the methods utilized, and the control points used. The record shall be adequate to allow the survey to be reproduced. A copy of each day's record shall be provided to the Engineer within three working days after the end of the shift.

The meaning of words and terms used in this provision shall be as listed in "Definitions of Surveying and Associated Terms" current edition, published by the American Congress on Surveying and Mapping and the American Society of Civil Engineers.

The survey work shall include but not be limited to the following:

1. Verify the primary horizontal and vertical control furnished by the Contracting Agency, and expand into secondary control by adding stakes and hubs as well as additional survey control needed for the project. Provide descriptions of secondary control to the Contracting Agency. The description shall include coordinates and elevations of all secondary control points.

2. Establish, the centerlines of all alignments, by placing hubs, stakes, or marks on centerline or on offsets to centerline at all log structure survey control point locations and at points on the alignments spaced no further than 25 feet.

3. Establish the planting zone boundaries and mitigation area boundaries, based on the final Clearing and Grubbing limits, the Selective Clearing and Grubbing - Buffer Mitigation Area limits, or as otherwise shown in the Plans.

4. Establish stream and stream bank grading limits, placing slope stakes at centerline increments not more than 50 feet apart. Establish offset reference to all slope stakes. If Global Positioning Satellite (GPS) Machine Controls are used to provide grade control, then slope stakes may be omitted at the discretion of the Contractor.

5. Establish stream channel and bank surface elevations by placing stakes at the top of subgrade and at the top of each course of surfacing. Subgrade and surfacing stakes shall be set at horizontal intervals not greater than 25 feet. Stakes shall be placed at all locations where the stream channel slope changes and at additional points such that the transverse spacing of stakes is not more than 12 feet. If GPS Machine Controls are used to provide grade control, then roadbed and surfacing stakes may be omitted at the discretion of the Contractor.

6. Establish intermediate elevation benchmarks as needed to check work throughout the project.

7. For all other types of construction included in this provision, provide staking and layout as necessary to adequately locate, construct, and check the specific construction activity.

8. Contractor shall determine if changes are needed to the creek profiles or sections shown in the Contract Plans in order to tie channel and bank grades in to existing grades at the upstream and downstream limits of the project. The Contractor shall submit these changes to the Engineer for review and approval 10 days prior to the beginning of work.

The Contractor shall provide the Contracting Agency copies of any calculations and staking data when requested by the Engineer.

To facilitate the establishment of these lines and elevations, the Contracting Agency will provide the Contractor with primary survey control information consisting of descriptions of two primary control points used for the horizontal and vertical control, as well as the information from the roughened channel centerline control table and the log survey control point tables included in the Contract Plans.

Primary control points will be described by reference to the project alignment and the coordinate system and elevation datum utilized by the project. In addition, the Contracting Agency will supply horizontal coordinates for the beginning and ending points and for each Point of Intersection (PI) on each alignment included in the project.

The Contractor shall ensure a surveying accuracy within the following tolerances:

	Vertical	Horizontal
Slope stakes	±0.10 feet	±0.10 feet
Subgrade grade stakes set 0.04 feet below grade	±0.01 feet	±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)
Stationing on roughened channel		±0.1 feet
Alignment on roughened channel		±0.05 feet
Stationing on engineered log structures		±0.1 feet
Alignment on engineered log structures		±0.05 feet

Surfacing grade stakes	±0.01 feet	±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)

The Contracting Agency may spot-check the Contractor's surveying. These spot-checks will not change the requirements for normal checking by the Contractor.

When staking engineered log structure and stream channel alignment and stationing, the Contractor shall perform independent checks from different secondary control to ensure that the points staked are within the specified survey accuracy tolerances.

The Contractor may calculate additional coordinates for the stream channel alignment. The Contracting Agency will verify any additional coordinates prior to issuing approval to the Contractor for commencing with the work. The Contracting Agency will require up to seven calendar days from the date the data is received.

Contract work to be performed using contractor-provided stakes shall not begin until the stakes are approved by the Contracting Agency. Such approval shall not relieve the Contractor of responsibility for the accuracy of the stakes.

Stakes shall be marked in accordance with Standard Plan A10.10. When stakes are needed that are not described in the Plans, then those stakes shall be marked, at no additional cost to the Contracting Agency as ordered by the Engineer.

Payment

Payment will be made for the following bid item when included in the proposal:

"Restoration Surveying", lump sum.

The lump sum contract price for "Restoration Surveying" shall be full pay for all labor, equipment, materials, and supervision utilized to perform the Work specified, including any resurveying, checking, correction of errors, replacement of missing or damaged stakes, and coordination efforts

(******)

Add the following new section:

1-05.16 Water and Power

(October 1, 2005 APWA GSP)

The Contractor shall make necessary arrangements, and shall bear the costs for power and water necessary for the performance of the work, unless the contract includes power and water as a pay item.

(******)

Add the following new section:

1-05.18 Record Drawings

(March 8, 2013 APWA GSP)

The Contractor shall maintain one set of full size plans for Record Drawings, updated with clear and accurate red-lined field revisions on a daily basis, and within 2 business days after receipt of information that a change in Work has occurred. The Contractor shall not conceal any work until the required information is recorded.

This Record Drawing set shall be used for this purpose alone, shall be kept separate from other Plan sheets, and shall be clearly marked as Record Drawings. These Record Drawings shall be kept on site at the Contractor's field office, and shall be available for review by the Contracting Agency at all times. The Contractor shall bring the Record Drawings to each progress meeting for review.

The preparation and upkeep of the Record Drawings is to be the assigned responsibility of a single, experienced, and qualified individual. The quality of the Record Drawings, in terms of accuracy, clarity, and completeness, is to be adequate to allow the Contracting Agency to modify the computer-aided drafting (CAD) Contract Drawings to produce a complete set of Record Drawings for the Contracting Agency without further investigative effort by the Contracting Agency.

The Record Drawing markups shall document all changes in the Work, both concealed and visible. Items that must be shown on the markups include but are not limited to:

- Actual dimensions, arrangement, and materials used when different than shown in the Plans.
- Changes made by Change Order or Field Order.
- Changes made by the Contractor.
- Accurate locations of storm sewer, sanitary sewer, water mains and other water appurtenances, structures, conduits, light standards, vaults, width of roadways, sidewalks, landscaping areas, building footprints, channelization and pavement markings, etc. Include pipe invert elevations, top of castings (manholes, inlets, etc.).

If the Contract calls for the Contracting Agency to do all surveying and staking, the Contracting Agency will provide the elevations at the tolerances the Contracting Agency requires for the Record Drawings.

When the Contract calls for the Contractor to do the surveying/staking, the applicable tolerance limits include, but are not limited to the following:

	Vertical	Horizontal
As-built sanitary & storm invert and grate elevations	± 0.01 foot	± 0.01 foot
As-built monumentation	± 0.001 foot	± 0.001 foot
As-built waterlines, inverts, valves, hydrants	± 0.10 foot	± 0.10 foot
As-built ponds/swales/water features	± 0.10 foot	± 0.10 foot
As-built buildings (fin. Floor elev.)	± 0.01 foot	± 0.10 foot
As-built gas lines, power, TV, Tel, Com	± 0.10 foot	± 0.10 foot
As-built signs, signals, etc.	N/A	± 0.10 foot

Making Entries on the Record Drawings:

- Use erasable colored pencil (not ink) for all markings on the Record Drawings, conforming to the following color code:
- Additions - Red
- Deletions - Green
- Comments Blue
- Dimensions Graphite
- Provide the applicable reference for all entries, such as the change order number, the request for information (RFI) number, or the approved shop drawing number.
- Date all entries
- Clearly identify all items in the entry with notes similar to those in the Contract Drawings (such as pipe symbols, centerline elevations, materials, pipe joint abbreviations, etc.).

The Contractor shall certify on the Record Drawings that said drawings are an accurate depiction of built conditions, and in conformance with the requirements detailed above. The Contractor shall submit final Record Drawings to the Contracting Agency. Contracting Agency acceptance of the Record Drawings is one of the requirements for achieving Physical Completion.

Payment will be made for the following bid item:

Record Drawings (Minimum Bid $ 5,500)	Lump Sum

Payment for this item will be made on a prorated monthly basis for work completed in accordance with this section up to 75% of the lump sum bid. The final 25% of the lump sum item will be paid upon submittal and approval of the completed Record Drawings set prepared in conformance with these Special Provisions.

A minimum bid amount has been entered in the Bid Proposal for this item. The Contractor must bid at least that amount.

Legal Relations and Responsibilities to the Public

Permits and Licenses

Section 1-07.6 is supplemented with the following:

(******)

SWPPP Preparation & Maintenance

Stormwater best management practices (BMPs) used on this project shall comply with the 2019 Stormwater Management Manual for Western Washington and the 2017 Snohomish County Drainage Manual. Detailed information concerning BMP requirements may be obtained from the Department of Ecology website at;

https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/Content/Resources/DocsForDownload/2019SWMMWW.pdf

and from the Snohomish County Department of Public Works website at;

https://www.snohomishcountywa.gov/1130/Drainage-Manual

The Contractor shall be responsible for obtaining a copy of the Notice of Intent Application prepared by the Contracting Agency for coverage under the State of Washington Construction Stormwater General Permit before receiving notice to proceed. A copy of the Application is provided herein.

The Contractor shall submit for approval by the Contracting Agency a Stormwater Pollution Prevention Plan(s) (SWPPP) in accordance with 8-01.3(1)A.

Utilities and Similar Facilities

Section 1-07.17 is supplemented with the following:

(******)

(April 2, 2007)

Locations and dimensions shown in the Plans for existing facilities are in accordance with available information obtained without uncovering, measuring, or other verification.

Public and private utilities, or their Contractors, will furnish all work necessary to adjust, relocate, replace, or construct their facilities unless otherwise provided for in the Plans or these Special Provisions. Such adjustment, relocation, replacement, or construction will be done during the prosecution of the work for this project. It is anticipated that utility adjustment, relocation, replacement or construction within the project limits will be completed as follows:

*** Relocation of overhead power and telecommunication lines along the easterly side of 55th Ave NE inclusive of two pole relocations ***

The Contractor shall attend a mandatory utility preconstruction meeting with the Engineer, all affected Subcontractors, and all utility owners and their Contractors prior to beginning onsite work.

The following addresses and telephone numbers of utility companies or their Contractors that will be adjusting, relocating, replacing or constructing utilities within the project limits are supplied for the Contractor's use:

*** Snohomish County PUD No. 1 ***
*** Attn: David Wood ***
*** 210 E. Division St ***
*** Arlington, WA 98223 ***
*** Office: (360) 435-7508 ***
*** Fax: (425) 267-6630 ***

Public Convenience and Safety

Construction Under Traffic

Section 1-07.23(1) is supplemented with the following:

(******)

(February 3, 2020)

Work Zone Clear Zone

The Work Zone Clear Zone (WZCZ) applies during working and nonworking hours. The WZCZ applies only to temporary roadside objects introduced by the Contractor's operations and does not apply to preexisting conditions or permanent Work. Those work operations that are actively in progress shall be in accordance with adopted and approved Traffic Control Plans, and other contract requirements.

During nonworking hours equipment or materials shall not be within the WZCZ unless they are protected by permanent guardrail or temporary concrete barrier. The use of temporary concrete barrier shall be permitted only if the Engineer approves the installation and location.

During actual hours of work, unless protected as described above, only materials absolutely necessary to construction shall be within the WZCZ and only construction vehicles absolutely necessary to construction shall be allowed within the WZCZ or allowed to stop or park on the shoulder of the roadway.

The Contractor's nonessential vehicles and employees private vehicles shall not be permitted to park within the WZCZ at any time unless protected as described above.

Deviation from the above requirements shall not occur unless the Contractor has requested the deviation in writing and the Engineer has provided written approval.

Minimum WZCZ distances are measured from the edge of traveled way and will be determined as follows:

Minimum Work Zone Clear Zone Distance

Regulatory Posted Speed	Distance From Traveled Way (Feet)
35 mph or less	10
40 mph	15
45 to 50 mph	20
55 to 60 mph	30
65 mph or greater	35

Prosecution And Progress

(******)

Add the following new section:

1-08.0 Preliminary Matters
(May 25, 2007 APWA GSP)

(******)
Add the following new section:

1-08.0(1) Preconstruction Conference
(October 10, 2008 APWA GSP)

Prior to the Contractor beginning the work, a preconstruction conference will be held between the Contractor, the Engineer and such other interested parties as may be invited. The purpose of the preconstruction conference will be:

1. To review the initial progress schedule;
2. To establish a working understanding among the various parties associated or affected by the work;
3. To establish and review procedures for progress payment, notifications, approvals, submittals, etc.;
4. To establish normal working hours for the work;
5. To review safety standards and traffic control; and
6. To discuss such other related items as may be pertinent to the work.

The Contractor shall prepare and submit at the preconstruction conference the following:

1. A breakdown of all lump sum items;
2. A preliminary schedule of working drawing submittals; and
3. A list of material sources for approval if applicable.

(******)
Add the following new section:

1-08.0(2) Hours of Work
(December 8, 2014 APWA GSP)

Except in the case of emergency or unless otherwise approved by the Engineer, the normal working hours for the Contract shall be any consecutive 8-hour period between 7:00 a.m. and 6:00 p.m. Monday through Friday, exclusive of a lunch break. If the Contractor desires different than the normal working hours stated above, the request must be submitted in writing prior to the preconstruction conference, subject to the provisions below. The working hours for the Contract shall be established at or prior to the preconstruction conference.

All working hours and days are also subject to local permit and ordinance conditions (such as noise ordinances).

If the Contractor wishes to deviate from the established working hours, the Contractor shall submit a written request to the Engineer for consideration. This request shall state what hours are being requested, and why. Requests shall be submitted for review no

later than 5 working days prior to the day(s) the Contractor is requesting to change the hours.

If the Contracting Agency approves such a deviation, such approval may be subject to certain other conditions, which will be detailed in writing. For example:

1. On non-Federal aid projects, requiring the Contractor to reimburse the Contracting Agency for the costs in excess of straight-time costs for Contracting Agency representatives who worked during such times. (The Engineer may require designated representatives to be present during the work. Representatives who may be deemed necessary by the Engineer include but are not limited to: survey crews; personnel from the Contracting Agency's material testing lab; inspectors; and other Contracting Agency employees or third-party consultants when, in the opinion of the Engineer, such work necessitates their presence.)
2. Considering the work performed on Saturdays, Sundays, and holidays as working days with regard to the contract time.
3. Considering multiple work shifts as multiple working days with respect to contract time even though the multiple shifts occur in a single 24-hour period.
4. If a 4-10 work schedule is requested and approved the non-working day for the week will be charged as a working day.
5. If Davis Bacon wage rates apply to this Contract, all requirements must be met and recorded properly on certified payroll

Progress Schedule

Progress Schedule Types

Type B Progress Schedule
(March 13, 2012 APWA GSP)

The first paragraph of Section 1-08.3(2)B is revised to read:

(******)

The Contractor shall submit a preliminary Type B Progress Schedule at or prior to the preconstruction conference. The preliminary Type B Progress Schedule shall comply with all of these requirements and the requirements of Section 1-08.3(1), except that it may be limited to only those activities occurring within the first 60-working days of the project.

Revise the first sentence of the second paragraph to read:

(******)

The Contractor shall submit **3** copies of a Type B Progress Schedule depicting the entire project no later than 21-calendar days after the preconstruction conference.

Payment

Section 1-08.3(5) is revised to read:

(January 7, 2019)

Payment will be made for the following Bid item when it is included in the Proposal:

"Min Bid Req – Type *** B *** Progress Schedule *** $5,000 ***", lump sum.

The lump sum price shall be full pay for all costs for furnishing the Type *** B *** Progress Schedule and preliminary Type *** B *** Progress Schedule.

Payment of 80 percent of the lump sum price will be made upon approval of the Progress Schedule.

Payment will be increased to 100 percent of the lump sum price upon completion of 80 percent of the original total Contract Award amount.

All costs for providing Type A Progress Schedules and Weekly Look-Ahead Schedules are considered incidental to other items of Work in the Contract.

No payment will be made for Schedule Updates that are required due to the Contractor's operations. Schedule Updates required by events that are attributed to the actions of the Contracting Agency will be paid for in accordance with Section 1-09.4.

Prosecution of Work

Section 1-08.4 is deleted and replaced with the following:

1-08.4 Notice to Proceed and Prosecution of Work

(July 23, 2015 APWA GSP)

Notice to Proceed will be given after the contract has been executed and the contract bond and evidence of insurance have been approved and filed by the Contracting Agency. The Contractor shall not commence with the work until the Notice to Proceed has been given by the Contracting Agency. The Contractor shall commence construction activities on the project site within ten days of the Notice to Proceed Date, unless otherwise approved in writing. The Contractor shall diligently pursue the work to the physical completion date within the time specified in the contract. Voluntary shutdown or slowing of operations by the Contractor shall not relieve the Contractor of the responsibility to complete the work within the time(s) specified in the contract.

When shown in the Plans, the first order of work shall be the installation of high visibility fencing to delineate all areas for protection or restoration, as described in the Contract. Installation of high visibility fencing adjacent to the roadway shall occur after the placement of all necessary signs and traffic control devices in accordance with 1-10.1(2). Upon construction of the fencing, the Contractor shall request the Engineer to inspect the fence. No other work shall be performed on the site until the Contracting Agency has accepted the installation of high visibility fencing, as described in the Contract.

Liquidated Damages

Section 1-08.9 is supplemented with the following:

(******)

Liquidated Damages Formula for Work to be completed below OHW

LD = 0.25C/T

Where:

LD = liquidated damages per working day (rounded to the nearest dollar)
C = original contract amount
T = original time for Physical Completion of work below OHW

The original time for Physical Completion of work below OHW is assumed to be consistent with the most restrictive in-water work windows specified in the permits attached to these Contract Documents.

Force Account

(October 10, 2008 APWA GSP)

Section 1-09.6 is supplemented with the following:

(******)

The Contracting Agency has estimated and included in the Proposal, dollar amounts for all items to be paid per force account, only to provide a common proposal for Bidders. All such dollar amounts are to become a part of Contractor's total bid. However, the Contracting Agency does not warrant expressly or by implication, that the actual amount of work will correspond with those estimates. Payment will be made on the basis of the amount of work actually authorized by Engineer.

Temporary Traffic Control

Traffic Control Management

General

Section 1-10.2(1) is supplemented with the following:

(January 3, 2017)

Only training with WSDOT TCS card and WSDOT training curriculum is recognized in the State of Washington. The Traffic Control Supervisor shall be certified by one of the following:

The Northwest Laborers-Employers Training Trust
27055 Ohio Ave.
Kingston, WA 98346
(360) 297-3035

Evergreen Safety Council
12545 135th Ave. NE
Kirkland, WA 98034-8709
1-800-521-0778

The American Traffic Safety Services Association
15 Riverside Parkway, Suite 100
Fredericksburg, Virginia 22406-1022
Training Dept. Toll Free (877) 642-4637
Phone: (540) 368-1701

Measurement

Reinstating Unit Items With Lump Sum Traffic Control

Section 1-10.4(3) is supplemented with the following:

(August 2, 2004)

The bid proposal contains the item “Project Temporary Traffic Control,” lump sum and the additional temporary traffic control items listed below. The provisions of Section 1-10.4(1), Section 1-10.4(3), and Section 1-10.5(3) shall apply.

*** Flaggers ***

*** Portable Changeable Message Sign ***

Division 2
Earthwork

Clearing, Grubbing, and Roadside Cleanup

Description

Section 2-01.1 is supplemented with the following:

(******)

(March 13, 1995)

Clearing and grubbing limits will be as shown in the Contract Plans or staked by the Engineer.

Area to be cleared and grubbed is approximately 0.5 acres.

Areas within the Buffer Mitigation Area receiving “Selective Clearing and Grubbing – Buffer Mitigation Area” to remove invasive vegetation total approximately 0.32 acres.

Section 2-01.1 is supplemented with the following:

(******)

Salvage” means carefully removing trees and brush identified in the field by the Engineer for removal and reuse with rootwads and as many branches intact as possible.

(******)

Add the following new section:

2-01.1(1) Protection of Existing Vegetation

The Contractor shall protect existing vegetation during clearing and grubbing of work areas as described below.

The Contractor shall minimize clearing and grubbing within the clearing and grubbing limits as approved by the Engineer, only clearing and grubbing to the minimum extent necessary to perform work. The Contractor shall not disturb or damage existing plant material beyond the clearing and grubbing limits and shall contact the Engineer if there is any conflict between the Contract Plans and field conditions. All costs for protecting the existing vegetation from damage shall be included in the Bid items “Clearing and Grubbing”, and “Selective Clearing and Grubbing – Buffer Mitigation Area”, and no separate payment will be made.

Prior to clearing operations, the Contractor shall flag all trees within and adjacent to the clearing and grubbing limits shown on the Contract Plans. The Contractor shall notify the Engineer after flagging is completed and arrange a meeting prior to the work near existing trees on the project site. At this meeting the Contractor and Engineer shall discuss the plan for tree protection during construction and any necessary limbing. The

Contractor shall be responsible for the protection of tops, major branches, trunks, and roots of existing trees, shrubs and other plants that are beyond the clearing and grubbing limits. Existing trees to remain in place and that are potentially subject to construction damage shall be protected as shown on the Contract Plans before any work is started in the vicinity of the trees.

The Engineer shall inspect and approve tree protection prior to clearing operations.

The Contractor shall verify with the Engineer before removing any interfering branches and shall remove all verified interfering branches without injury to the tree trunks. Any grading or other earthwork shown on the Contract Plans near trees that are to be saved shall not occur within the drip line of the tree canopy to protect the tree's root system unless approved otherwise by the Engineer.

Regulated noxious weeds: The Contractor shall have on-site at all times during construction current copies of the Washington State Noxious Weed List and Monitor List (http://www.nwcb.wa.gov) and the Snohomish County noxious weed list (https://snohomishcountywa.gov/750/Noxious-Weeds-List).

Disposal Method No. 2 – Waste Site

Section 2-01.2(2) is supplemented with the following:

(******)

No waste site has been provided for the disposal of excess material. The Contractor shall make his or her own arrangements for obtaining waste sites in accordance with Section 2-03.3(7)C Contractor-Provided Disposal Site of the Standard Specifications. All costs involved shall be considered incidental to and included in the unit contract prices for other bid items in this contract. All waste generated or encountered under this Contract must be managed per all applicable local, state and federal regulations and law.

Clearing

Section 2-01.3(1) is supplemented with the following:

(******)

8. The Contractor shall flag the clearing limits for each Engineered Log Structure (ELS, including the Bank Log Structures, and the Log Revetment Structures) and Bridge and verify clearing limits with Contracting Agency or Engineer prior to clearing. The Contractor shall clear each ELS and Bridge site and surrounding staked area as approved by Contracting Agency or Engineer and as specified in these Contract Specifications to perform the work such as ELS or Bridge construction and staging of log materials required for construction.

   When existing woody debris and logs are present within the disturbance extents for construction of an ELS, the Contractor shall salvage and stockpile the existing woody debris for incorporation into the ELS as directed by the Engineer.

9. Reuse all felled trees equal to or greater than 8 inches in diameter (at breast height) and greater than 15 feet long, branches and limbs generated during felling activities, and other slash debris generated during clearing and other construction activities as "slash material" in the construction of the Engineered

Log Structures and in areas of slash placement shown on the Contract Plans. Slash material shall be free of non-native species, invasive species, noxious weeds, and other unwanted vegetation as determined by the Engineer. All non-native and invasive species vegetative material cleared by the Contractor shall be managed per Section 8-02.3(2)B Weed and Pest Control Plan in these Special Provisions. All Engineer approved slash material generated during construction shall remain on site and be placed in locations designated on the Contract Plans and as designated by the Engineer. Salvage and temporary stockpiling of slash material is included in the bid item “Clearing and Grubbing”. Placement of the slash material within the Engineered Log Structures is included in the individual bid items for Engineered Log Structures.

The Contractor shall stockpile slash material. The Contractor shall supply the Engineer or Contracting Agency with an inventory and an approximation of the volume in cubic yards of compacted slash material prior to placement in its final location.

(******)

Add the following new section:

2-01.3(1)A Selective Tree Removal and Salvage

Selective tree removal shall be included in the bid item “Clearing and Grubbing”. To provide a common proposal to all bidders, the trees designated for removal and salvage are shown on the Contract Plans. The actual number of trees designated for removal and salvage may vary from the inventory shown on the Contract Plans.

Prior to clearing operations, the Contractor shall flag all trees over 15 feet high, or 8-inch diameter or greater (measured at breast height), within and adjacent to the clearing and grubbing limits shown on the Contract Plans. The Contractor shall notify the Engineer after flagging is completed and arrange a meeting prior to the removal of any existing trees on the project. At this meeting the Contractor, a designated Representative of the Contracting Agency, and Engineer shall inspect and agree upon which trees can be removed.

If the Contractor removes or damages any existing trees not designated for removal due to the Contractor’s operation, such tree(s) shall be restored or replaced by the Contractor to a condition similar or equal to that existing before such damage or removal. Any tree designated for salvage that is significantly damaged in the opinion of the Engineer for any reason related to the Contractor’s operations while removing the tree shall be replaced with a tree like the tree significantly damaged, to be imported and installed at the expense of the Contractor.

All replacements shall be inspected and approved by the Engineer prior to Engineered Log Structure construction and site planting work.

The Contractor shall not treat salvaged trees with preservatives, stains, insecticides, or chemicals of any kind. The Contractor shall handle salvaged trees in a manner that does not crack or break the logs or root wads. If salvaged trees are to be temporarily stored in a location other than their final placement location,

they shall be protected from damage during construction activities in a location that shall not be subjected to potential inundation by stormwater runoff, streamflow, or groundwater prior to their final placement.

Trees to be salvaged shall be taken down uncut with rootwads attached and shall not be cut or altered during felling activities without prior approval by the Engineer. Limbs, branches and upper stems broken during felling and handling activities shall be added to the slash stockpile for reuse in Engineered Log Structures. During felling, handling, and placement activities, the Contractor shall minimize damage to the salvaged tree and minimize removal of limbs and branches to maintain as much of the original length and canopy as possible. The Contractor shall obtain approval from the Engineer prior to removing large interfering branches from salvaged trees and shall remove the minimum necessary to safely fell, handle and place the tree in its final location within the Engineered Log Structure. Sizes of felled salvaged trees following placement in their final location shall conform to the dimensions described for “racking material” in the Contract Plans.

The Engineer reserves the right to inspect felled trees and reject any salvaged trees that compromise the integrity of their intended use.

Grubbing

Section 2-01.3(2) is supplemented with the following:

(******)

Grubbing of the area designated for “Clearing and Grubbing” shall include removal of root material down to a maximum depth of 6-inches. On-site handling, temporary stockpiling, and offsite disposal of grubbed material, as described in the Contract Specifications, is included in the bid item “Clearing and Grubbing”.

Grubbing of the area designated for “Selective Clearing and Grubbing – Buffer Mitigation Area” shall include removal of root material from all non-native and invasive vegetative species down to a maximum depth of 6-inches. On-site handling, temporary stockpiling, and offsite disposal of grubbed material, as described in the Contract Specifications, is included in the bid item “Selective Clearing and Grubbing – Buffer Mitigation Area”.

All non-native and invasive species vegetative material grubbed by the Contractor shall be managed per Section 8-02.3(2)B Weed and Pest Control Plan of these Special Provisions.

Grubbing shall be conducted in accordance with Sections 2-01.2(2) and Section 2-03.3(7)C of the Contract Specifications.

Measurement

Section 2-01.4 is supplemented with the following:

(******)

Clearing and Grubbing shall be measured per acre cleared and grubbed as described herein.

Selective Clearing and Grubbing – Buffer Mitigation Area shall be measured per acre of the Buffer Mitigation Area selectively cleared and grubbed as described herein.

Payment

Section 2-01.5 is supplemented with the following:

(******)

The cost for Structure Excavation shall be incidental to construction of ELS structures per Section 8-05 of these Special Provisions.

Removal of Structures and Obstructions

Description

Section 2-02.1 is supplemented with the following:

(******)

Removal of Structures and Obstructions – Asphalt

This item consists of demolition, removal, and hauling of existing asphaltic concrete pavement, as shown on the plans or designated by the Engineer.

Sawcutting

This item includes sawcutting pavement the full depth of the pavement section where shown on the Contract Plans, and as designated by the Engineer. The location of sawcutting shall follow the limits of excavation.

Construction Requirements

Section 2-02.3 is supplemented with the following:

(******)

(February 17, 1998)

Removal of Obstructions

This item consists of demolition, removal, and hauling of all other structures and obstructions as shown on the plans that are not explicitly included in other bid items. Items are known to exist, but are not limited to the following:
*** 4' Diameter Corrugated Metal Pipe Culvert (80 LF) ***
*** Three (3) Concrete Weirs (30 LF in total) ***

(******)

Removal of Structures and Obstructions - Asphalt

Asphaltic concrete shall be removed without any subgrade or adjacent soil or other material that could prohibit recycling. All asphaltic concrete removed shall be hauled and recycled off-site.

Sawcutting

Transverse joints for pavement and sidewalks shall be cut before excavation work and shall produce a clean vertical edge. The Contractor is responsible for protecting the pavement edge after sawcutting. If the existing asphalt cracks near the sawcut, a

second sawcut will be required at no additional compensation. The Engineer will establish the limits of the second sawcut. The Contractor is hereby advised that depths of existing pavement are variable and are further described in the Geotechnical Report as attached herein.

Measurement

Section 2-02.4 is supplemented with the following:

(******)

"Removal of Structures and Obstructions – Asphalt" will be measured per ton.

"Sawcutting" will be measured by its unit depth in inches multiplied by its unit length in feet. (IN-FT).

Payment

Section 2-02.5 is supplemented with the following:

(******)

"Removal of Structures and Obstructions - Asphalt", per ton.
The unit contract price per ton for "Removal of Structures and Obstructions – Asphalt" will be full payment for all tools, equipment, labor, materials, haul, and incidentals required to complete this work as specified herein.

"Sawcutting", per in-ft.
The unit contract price per in-ft for "Sawcutting" will be full payment for all tools, equipment, labor, materials, haul, and incidentals required to complete this work as specified herein.

Roadway Excavation and Embankment

Description

Section 2-03.1 is supplemented with the following:

(******)
Excavation necessary to construct the ELSs is specified in Sections 2-09 and 8-05 of these Special Provisions.

(******)
Add the following new section:

2-03.2 Materials

Materials excavated on site shall be segregated into two general categories: material for salvage, and material for disposal. The Engineer will identify materials suitable for salvage or disposal. "Channel Excavation Incl. Haul" and "Ditch Excavation Incl. Haul" will include those materials determined by the Engineer to be designated for offsite disposal because those materials either 1) contain invasive species, 2) are deemed otherwise unsuitable for onsite usage, or 3) are in excess of what is required for salvage for reuse as Selected Materials. The Contractor is responsible for hauling off site only excess material or that

material deemed unsuitable for salvage by the Engineer. The remaining excavated material not hauled offsite or stockpiled will be reused for construction under this contract. Channel Excavation shall include the excavation, handling, or mixing of the following classes of selected materials shown on the Contract Plans:

1. Native Alluvium (Streambed Sediment)
2. Topsoil Type B
3. Coir Lift Backfill Material
4. Light Loose Riprap

Excavated Native Alluvium shall meet the requirements of Section 9-03.11(1) (Streambed Sediments). Should a shortage of Native Alluvium or Streambed Sediment, or Topsoil Type B occur, and the Contractor has wasted or otherwise disposed of salvageable material, the Contractor shall furnish Streambed Sediment per Section 9-03.11(1) in place of Native Alluvium and/or Topsoil Type A per Section 9-14.1(3) in place of Topsoil Type B at no expense to the Contracting Agency.

Topsoil Type B shall meet the requirements of Section 9-14.2(2). Material shall be salvaged from areas to be planted where earth work occurs. Material shall be salvaged from a maximum depth of 1 foot. Stockpiled material shall be protected and kept in a fertile, healthy condition prior to placement. Stockpiles shall be no higher than 3 feet above the surface on which they are placed. Prior to placement of Topsoil Type B, test and amend according to Section 8-02.3(5).

Coir Lift Backfill Material shall consist of 3/4 by volume Topsoil Type B mixed with 1/4 by volume excavated Native Alluvium (Streambed Sediment). Excavated Native Alluvium used for the Coir Lift Backfill Material shall contain no deleterious material, minimal amounts of clay, no frozen lumps, and limited organic material no greater than 3 inches in length.

Bid tab quantities do not include salvage and reuse of Light Loose Riprap, or Gravel Borrow. Salvage and reuse of these materials will require adjustments to the quantities in the contract documents.

Construction Requirements

Disposal of Surplus Material

Section 2-03.3(7) is supplemented with the following:

(******)

(March 13, 1995)

The Contractor is not required to utilize the Contracting Agency provided site(s), and may make arrangements, at the Contractor's expense, for the disposal of waste materials, and shall protect the Contracting Agency from all damages arising from the Contractor's waste disposal operations.

(******)

Surplus materials may be disposed of within the Contracting Agency furnished site, to be negotiated by the Contractor.

Embankment Construction

(******)
Add the following new section:

2-03.3(5)A Coir Lift Construction

Coir Lift Construction will be used for construction of “Terraced Bank Restoration for Steep Slopes”, “Coir Bank Restoration Above Log Structures”, and “Coir and Rock Bank Restoration Adjacent to Bridge”.

Coir lifts consist of coir material wrapped around soil and stacked vertically to form a reinforced steep slope face. Each coir lift shall be installed with coir fabric wrapped around Coir Lift Backfill Material in accordance with the Contract Plans and the coir fabric manufacturer’s recommendations. The finished face of the coir lift embankment shall correspond to the finished bank grades and maximum side slopes as specified in the Contract Plans.

Each coir lift shall be 12-inches in height and successive lifts shall be stacked up to the total embankment height indicated on the Contract Plans. Coir lift is to be comprised of a woven outer coir blanket and non-woven inner coir blanket, as described herein. For each individual 12-inch coir lift, the Contractor shall place the woven outer coir blanket on a level bench at least 3 feet wide. The woven outer coir material shall be unrolled and placed so that the length is parallel to the stream. The non-woven inner coir material shall be placed over the woven outer coir material. The Contractor shall place and compact the Coir Lift Backfill Material to a height of 12 inches over the non-woven coir material. Coir Lift Backfill Material shall be placed in no greater than 6-inch lifts and compacted using Method D compaction to achieve a minimum compacted density of 85% as measured in accordance with Section 2-03.3(14)D Compaction and Moisture Control Test of the Standard Specifications or as approved by the Engineer. The Contractor may elect to use a temporary form to hold the coir and backfilled material to more easily achieve the finished lines, grades, and slopes of the bank as shown on the Contract Plans.

Prior to wrapping the final woven outer and non-woven inner coir material over the Coir Lift Backfill Material, the Contractor shall seed the final graded surface of the compacted Coir Lift Backfill Material using the seed mix specified in sections 9-14.2 Seed . The combined woven outer and non-woven inner coir material shall then be overlapped, placed into an anchor trench, then staked per the manufacturer’s specifications for stream applications ensuring the upstream blanket overlaps the downstream blanket. The anchor trench shall be approximately 12-inch deep by 12-inch wide where applicable, see Contract Plans.

(******)
Add the following new section:

2-03.3(5)B Bank Restoration for Shallow Slopes

Bank Restoration for Shallow Slopes shall be installed from the toe of the slope upward with coir laid over Topsoil Type B in accordance with the Contract Plans and the coir blanket manufacturer’s recommendations. The finished face of the Bank Restoration Above Log Structure shall correspond to the finished bank grades and maximum side slopes as specified in the Contract Plans.

The woven coir material shall be unrolled and placed so that the length is perpendicular to the stream. Woven coir shall be placed starting at the bottom of the slope and Topsoil Type B shall be placed in no greater than 6-inch lifts and compacted with an excavator bucket or by hand equipment compaction methods to achieve a minimum compacted density of 85% as measured in accordance with Section 2-03.3(14)D Compaction and Moisture Control Test of the Standard Specifications or as approved by the Engineer.

Prior to laying the woven coir over Topsoil Type B, the Contractor shall seed the final graded surface of the compacted Topsoil Type B using the seed mixes specified in sections 8-01.2(1) Materials Specifications and 8-02.3(9)B, Seeding and Fertilizing. The woven coir material shall be overlapped, placed in the anchor trench, and staked per the manufacturer's specifications for stream applications ensuring the upstream blanket overlaps the downstream blanket and the upslope blanket overlaps the downslope blanket. The anchor trench shall be approximately 12-inch deep by 12-inch wide where applicable, see Contract Plans.

(******)
Add the following new section:

2-03.3(5)E Bank Under Bridge

The Contractor shall place and compact the light loose riprap to Method D requirements per the Contract Plans.

Compacting Earth Embankments
Section 2-03.3(14)C is supplemented with the following:

(******)
The Contractor shall use Method C for compacting roadway embankments.

The Contractor shall use Method D for compacting earth embankments to construct the new Kackman Creek channel and streambanks as shown on the Contract Plans

Method D - Method D compaction shall include the use of the underside of an excavator bucket and applying pressure and impact to compact material to the satisfaction of the Engineer. The Contractor shall use Method D compaction for the embankment slopes for the stream channel section and for the Engineered Log Structures as shown on the Contract Plans. The Contractor shall also use Method D compaction for the placement of streambed materials for the channel bed and to minimize void space around the logs and larger rock to the satisfaction of the Engineer.

Excavation of Channels and Ditches
Section 2-03.3(14)M is supplemented with the following:

(******)
Excavation and backfilling may begin after the installation of any necessary Temporary Erosion and Sediment Control and water management BMPs as specified on the Contract Plans or in the project permits. Channel Excavation shall include the excavation, segregating, temporary stockpiling and onsite handling requirements of all earthwork excavation including channel excavation, bank

excavation, and all related earthworks, excluding roadway excavation, ditch excavation, and structure excavation, to establish the new Kackman Creek channel and streambank grades as shown on the Contract Plans.

Ditch Excavation Incl. Haul shall include the excavation, segregating, temporary stockpiling and onsite handling requirements of all earthwork excavation including ditch excavation, bank excavation, and all related earthworks, to establish the new ditch grades as shown on the Contract Plans.

Upon Physical Completion of the Work, excavated material remaining and not required for salvage or reuse as directed by the Engineer or as described in these Special Provisions shall be disposed of by the Contractor per the bid item “Channel Excavation Incl. Haul” or “Ditch Excavation Incl. Haul” and in accordance with Section 2-03.3(7)B and Section 2-04 of the Standard Specifications.

Measurement

Section 2-03.4 is supplemented with the following:

(******)

“Terraced Bank Restoration for Steep Slopes”, per square yard along the face of the placed, combined, and staked overlapping outer woven coir blanket and inner nonwoven coir blanket, computed from in-place, field measurements and estimates made by the Engineer.

“Coir Bank Restoration Above Log Structures”, per square yard along the face of the placed, combined, and staked overlapping outer woven coir blanket and inner nonwoven coir blanket, computed from in-place, field measurements and estimates made by the Engineer.

“Bank Restoration for Shallow Slopes”, per square yard along the face of the placed, and staked woven coir blanket, computed from in-place, field measurements and estimates made by the Engineer.

“Coir and Rock Bank Restoration Adjacent to Bridge”, per square yard along the face of the placed, combined, and staked overlapping outer woven coir blanket and inner nonwoven coir blanket, computed from in-place, field measurements and estimates made by the Engineer.

(March 13, 1995)

Only one determination of the original ground elevation will be made on this project. Measurement for roadway excavation and embankment will be based on the original ground elevations recorded previous to the award of this contract.

If discrepancies are discovered in the ground elevations which will materially affect the quantities of earthwork, the original computations of earthwork quantities will be adjusted accordingly.

Earthwork quantities will be computed, either manually or by means of electronic data processing equipment, by use of the average end area method or by the finite element analysis method utilizing digital terrain modeling techniques.

Copies of the ground cross-section notes will be available for the bidder's inspection, before the opening of bids, at the Engineer's office and at the Region office.

Upon award of the contract, copies of the original ground cross-sections will be furnished to the successful bidder on request to the Engineer.

Payment

Section 2-03.5 is supplemented with the following:

(******)

The unit cost per square yard for “Terraced Bank Restoration for Steep Slopes”, shall be full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for completing all work involved in excavating, placing, staking, backfilling with soil (including Topsoil Type B, Topsoil Type A, riprap, Rock for Erosion and Scour Protection Class A, and excavated alluvium as described herein), compacting soil and rock, and grading materials for construction of stream banks as shown in the Contract Plans. Material and labor costs for Seeding and Fertilizing by Hand are included in other bid items.

The unit cost per square yard for “Coir Bank Restoration Above Log Structures”, shall be full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for completing all work involved in excavating, placing, staking, backfilling with soil (including Topsoil Type B, Topsoil Type A, riprap, Rock for Erosion and Scour Protection Class A, and excavated alluvium as described herein), compacting soil and rock, and grading materials for construction of stream banks as shown in the Contract Plans. Material and labor costs for Seeding and Fertilizing by Hand are included in other bid items.

The unit cost per square yard for “Bank Restoration for Shallow Slopes”, shall be full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for completing all work involved in excavating, placing, staking, backfilling with soil (including Topsoil Type B, Topsoil Type A as described herein), compacting soil, and grading materials for construction of stream banks as shown in the Contract Plans. Material and labor costs for Seeding and Fertilizing by Hand are included in other bid items.

The unit cost per square yard for “Coir and Rock Bank Restoration Adjacent to Bridge” shall be full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for completing all work involved in excavating, placing, staking, backfilling with soil (including Topsoil Type B, Topsoil Type A, riprap, Rock for Erosion and Scour Protection Class A, and excavated alluvium as described herein), compacting soil and rock, and grading materials for construction of stream banks as shown in the Contract Plans. Material and labor costs for Seeding and Fertilizing by Hand are included in other bid items.

(******)

Add the following new section:

2-05 Roughened Channel

2-05.1 Description

Streambed Sediment, Streambed Cobbles, and Streambed Boulders shall be placed in the stream channel in the proportions and dimensions as described herein for the Roughened Channel Mix used to construct the Roughened Channel as shown on the Contract Plans. The Roughened Channel Mix will be a spatially well graded mix of aggregate from the sands fraction up to 2-man boulders.

2-05.2 Materials

Roughened Channel aggregate materials shall meet the requirements of Section 9-03.11(3) of the Standard Specifications. Streambed Cobbles and Boulders shall be hard, sound and durable material, free from seams, cracks, and other defects tending to compromise boulder resistance to weathering. Streambed Boulders shall be rounded to sub-angular in shape and the thickness axis shall be greater than 60% of the length axis. Streambed Boulders, Cobbles, and Streambed Sediment material may be salvaged from channel excavation and reused to construct the Roughened Channel Mix.

All imported streambed materials shall be approved by the Engineer at an offsite location before delivery to the site.

Roughened Channel Mix:

Materials for the Roughened Channel Mix shall be a blend of Streambed Boulders, Rock for Erosion and Scour Protection Class A, and Streambed Sediment and shall meet the requirements as described in Sections 9-03.11(1) and 9-03.11(3) of the Standard Specifications. The approximate gradation of the Roughened Channel Mix material shall be as follows:

Material	Quantity
Streambed Sediment	30%
Rock for Erosion and Scour Protection Class A	50%
Two Man Boulders (18” – 28”)	20%

Individual boulders shall be placed to the elevations shown on the Contract Plans with the overall Roughened Channel Mix consisting of a uniform mix of these rock sizes so that all voids are filled and the streambed has a similar depth and appearance as the downstream channel so that there are randomly protruding boulders above the surrounding average finished grade of the channel to create a complex rough surface with a complex low-flow channel geometry as indicated on the Contract Plans.

2-05.3 Construction Requirements

Roughened Channel Mix shall be placed in the locations and to the lines and grades shown on the Contract Plans except as adjusted by the Engineer to take into account site-specific conditions. Depths of burial and thickness shown on the Contract Plans are estimates only. Location and sequencing of placement of the Streambed Boulders to construct the Roughened Channel is critical for proper function of the roughened streambed. The profile grade shown on the Contract Plans represents the average grade along the centerline of the channel. Streambed Boulders shall be placed with some boulders above, and some boulders below the average grade as shown on the Contract Plans and as directed by the Engineer. Exact placement will depend on the size and shape of each boulder and distribution of the boulders to meet the bed elevations provided on the Contract Plans.

To create the Roughened Channel Mix installed to the proper proportions and dimensions, two-Man boulders shall be placed first, followed by Streambed Cobbles, then Streambed Sediment as directed by the Engineer to fill the voids and lock the boulders together to create a well graded and well distributed mix of aggregate in the stream channel. End dumping of the Roughened Channel Mix to the final grades will not be permitted even if the material proportions in the truck meet the material gradation specification. The Contractor shall compact the Roughened Channel Mix using Method D as described in Section 2-03.3(14)C of these specifications.

Boulder elevation changes between adjacent boulders and cobbles is required to provide a hydraulically rough and irregular finished surface. Requirements for elevation variations between adjacent boulders are based on the average channel cross section and profile elevations along the channel centerline as provided on the Contract Plans. Properly placed boulders will provide multiple flow paths around boulders under low flow conditions. Due to boulder size variations and the strict elevation requirements for fish passage, the Engineer will provide guidance for adjusting adjacent boulder top elevations if the vertical and horizontal tolerances cannot be met and adjustments to boulder positioning and orientation are required. The Contractor shall expect to place and readjust some of the boulders several times to meet the boulder elevation variations and tolerances specified, or to adjust adjacent boulders if the tolerances are not met to ensure proper hydraulic and fish passage requirements of the roughened irregular surface of the channel bed.

2-05.4 Measurement

Roughened Channel Mix will be measured per ton in accordance with the requirements of the Contract Plans and these Special Provisions.

2-05.5 Payment

Payment will be made in accordance with Section 1-04.1 for the following Bid Items that are included in the Proposal:

"Roughened Channel Mix", per ton.

The unit Contract price for "Roughened Channel Mix" shall be full pay for all materials, labor, tools, equipment, and supplies necessary for the mixing and placing of the Roughened Channel Mix to the dimensions and tolerances specified in these Special Provisions and shown on the Contract Plans.

Structure Excavation

Description

Section 2-09.1 is supplemented with the following:

(******)

Excavation and backfilling may begin after the installation of any necessary Temporary Erosion and Sediment Control and water management BMPs as specified on the Contract Plans or in the project permits. Work covered under this specification consists of all the labor, materials, and equipment necessary to achieve a finished grade in all excavation and backfill locations. Structure Excavation consists of excavating, segregating, stockpiling and handling channel Native Alluvium and channel bank material, backfilling and compacting

locally excavated, non-imported material for construction of the Bank Log Structures and Log Revetment Structures.

Dewatering for inspecting the structure foundation is not required. The Contractor may place the lower logs “in-the-wet” to minimize water management provided the work area is completely isolated from flow of the creek and the water is contained within the structure excavation extents per Section 8-05. If working below the water surface, the Contractor shall account for the buoyancy of the wood during placement to ensure the logs are placed in accordance with the layers shown in the Contract Plans.

Construction Requirements

Backfilling

Section 2-09.3(1)E is deleted in its entirety and replaced with the following:

(******)

Backfilling of ELSs shall be conducted per Section 8-05 of these Special Provisions.

Classification of Structure Excavation

Section 2-09.3(2) is supplemented with the following:

(******)

All excavation associated with Bank Log Structures and Log Revetment Structures, per Section 8-05, will be classified as Class B.

(******)

Add the following new section:

2-09.3(4) Riprap Excavation and Salvage

The Contractor shall excavate all angular revetment rock (i.e., riprap) larger than 6 inches in nominal diameter from the roadway embankment, from the weirs, and from areas of inlet and outlet protection for the existing culvert. The approximate extents of existing rock are shown on the survey in the Plans. This work is exempt from the provisions of Section 1-04.6.

Excavated angular rock that meets the requirements of Section 9-13.1(3) of these Special Provisions shall be classified as “Light Loose Riprap” and reused in the project as shown on the Plans.

Measurement

Section 2-09.4 is supplemented with the following:

(******)

No specific unit of measurement shall apply for Structure Excavation. Structure Excavation will not be measured.

Payment

Section 2-09.5 is supplemented with the following:

(******)

The cost for Structure Excavation shall be incidental to construction of Bank Log Structures and Log Revetment Structures per Section 8-05 of these Special Provisions.

Division 5
Surface Treatments and Pavements

Hot Mix Asphalt

Materials

Mix Design – Obtaining Project Approval

Section 5-04.2(2) is supplemented with the following:

(******)

(January 3, 2011)

ESAL's

The number of ESAL's for the design and acceptance of the HMA shall be *** 1 *** million.

.

Weather Limitations

The first sentence of Section 5-04.3(1) is revised to read:

(August 3, 2009)

HMA for wearing course shall not be placed on any travelled way from *** October 15th *** and through March 31st of the following year without written approval from the Engineer.

Material Transfer Device or Material Transfer Vehicle

(April 4, 2016)

Section 5-04.3(3)D is deleted in its entirety.

Division 6
Structures

Concrete Structures

Measurement

Section 6-02.4 is supplemented with the following:

(******)

(August 2, 2010)

*** Superstructure Kackman Creek Bridge *** contains the following approximate quantities of materials and work:

***

Concrete Class 4000D (for Bridge Deck)	95	CY
Concrete Class 4000 (for End Diaphragm)	32	CY
St. Reinf. Bar	20,300	LB
WF 42TDG Prestressed Girders	690	LF

***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the lump sum contract price for *** Superstructure Kackman Creek Bridge *** even though the actual quantities required may deviate from those listed.

Payment

The fifth and sixth bid items under Section 6-02.5 are supplemented with the following:

(******)

(April 6, 2015)

The contract quantity specified for “Steel Reinf. Bar for Bridge” includes the quantity for the epoxy-coated steel reinforcing bars located in the substructure of the bridge(s) included in this project.

Section 6-02.5 is supplemented with the following:

(******)

(June 26, 2000)

Bridge and Structures Minor Items

For the purpose of payment, such bridge and structures items as *** butyl rubber sheeting, adhesive for butyl rubber sheeting, *** etc., for which there is no pay item included in the proposal, are considered as bridge and structures minor items. All costs in connection with furnishing and installing these bridge and structures minor items as shown and noted in the Plans and as outlined in these specifications and in the Standard Specifications shall be included in the *** associated item of Work. ***

Piling

Test Piles

Section 6-05.3(10) is supplemented with the following:

(******)

(March 6, 2000)

The Contractor shall furnish and drive *** cast-in-place concrete *** test piles at the following locations or at locations designated by the Engineer:

*** Pier 1 and 2 foundations ***

The *** cast-in-place concrete *** test piles shall be driven in the location of permanent piles and the number of permanent *** cast-in-place concrete *** piles required for this project has been reduced by the appropriate number.

Bridge Railings

Construction Requirements

Metal Railings

Section 6-06.3(2) is supplemented with the following:

(******)

Approach guardrails shall be made structurally continuous with bridge railings.

All exposed structural steel in bridge railings shall be hot-dip galvanized steel.

Payment

Section 6-06.5 is supplemented with the following:

(******)

All costs in connection with constructing the connections between the bridge railing and beam guardrail shall be included in the unit Cost per linear foot of “Bridge Railing Type Snohomish County”.

(******)

Add the following new section:

6-20 Temporary Shoring`

6-20.1 Description

This work shall consist of providing temporary shoring to retain soil in order to facilitate staged construction as shown in the Plans.

6-20.1 Materials

Materials shall meet the requirements of the following sections:

Concrete and Shoring Components	6-02
Steel	6-03
Timber	6-04
Piling	6-05

6-20.3 Construction Requirements

Plans for Temporary Shoring

The Contractor shall submit all plans for temporary shoring for support of the existing structure for approval by the engineer in the same manner described in Section 6-02.3(16) for falsework and formwork.

Except for the placement of shoring foundation pads and piles, construction of any unit of shoring shall not start until the Engineer has reviewed and approved the shoring plans for that unit.

Costs associated with modifying shoring to bring it into compliance with the approved shoring plans shall be at no additional cost to the Contracting Agency.

Design of all temporary shoring shall be the responsibility of the Contractor. The Contractor shall submit the associated design calculations to the Engineer for review and approval.

All shoring plans and design calculations shall be stamped and signed by a Professional Engineer, licensed under Title 18 RCW, State of Washington, in the branch of Civil or Structural Engineering.

Each sheet of the shoring plans shall carry the following:

1. Professional Engineer's original signature, date of signature, original seal (photocopies not accepted, and registration number.

2. The initials and dates of all participating design professionals.

3. Clear notation of all revisions including identification of who authorized the revision, who made the revision, and the date of the revision.

4. The contract number, contract title, and sequential sheet number. These shall also be on any related documents.

5. Identify where the shoring plan will be utilized by referencing Contract Plan sheet number and related item or detail

Design calculations shall carry on the cover page, the Professional Engineer's original signature, date of signature, original seal (photocopies not accepted), registration number, and date of expiration. The cover page shall include the contract number, contract title, and sequential index to calculation page numbers.

A State of Washington Professional Engineer, licensed under Title 18 RCW, State of Washington, in the branch of Civil or Structural Engineering may be retained to check, review, and certify shoring plans and calculations of an individual who is licensed in another state, provided that the conditions specified in Section 6-02.3(16) for falsework

and formwork plans and calculations are satisfied for the shoring plans and calculations.

Design Criteria

Except as modified in this section, the design of temporary shoring shall meet the requirements specified in Sections 6-02.3(17)A, 6-02.3(17)B, and 6-02.3(17)C for falsework.

The design shall be in accordance with the *AASHTO LRFD Bridge Design Specifications (8th Edition)*.

Loads

1. Vehicle/Lane Loading: HL-93

2. Lateral Loads: Provide lateral load capacity to resist lateral earth pressure and vehicle/lane loading.

3. Other Loads per *AASHTO LRFD Bridge Design Specifications (8th Edition)*

Quality Assurance

The Contractor shall retain copies of all mill certificates, concrete batch records, strength tests, pile installation records, and other pertinent documentation.

Movement Compensation

The elevation of the detour road shall be monitored during remainder of the Contract by means of survey, telltales, or other approved means. Monitoring shall be performed at least once daily, and more often if substantial movement is observed. A record of daily measurements shall be retained. The Contractor shall notify the Engineer immediately if movement of more than 3/8” is observed at any location. The affected temporary shoring shall be adjusted to compensate for the movement in a manner shown on the approved shoring plans.

6-20.5 Payment

Payment will be made for the following bid item when included in the proposal:

"Temporary Shoring", lump sum.

All costs for labor, tools, equipment, and materials for the work required for furnishing, installing, maintaining, and removing temporary shoring, including but not limited to: excavating the foundation, removing and replacing unsuitable foundation soils, design, fabrication, and erection of temporary shoring, monitoring movement, and adjusting temporary shoring to compensate for movement will be included in the bid item cost for “Temporary Shoring”.

Division 7
Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits

Storm Sewers

Measurement

(December 23, 2019 TT SP)

Section 7-04.4 is supplemented with the following:

(******)

Schedule A Storm Sewer Pipe __ IN. DIAM. will be measured per Linear Foot.

Payment

(December 23, 2019 TT SP)

Section 7-04.5 is supplemented with the following:

(******)

"Schedule A Storm Sewer Pipe __ IN. DIAM." per linear foot.

The unit contract price Schedule A Storm Sewer Pipe __ IN. DIAM shall be full payment for all storm sewer pipe of the s and size specified shall be full payment for all work to complete the installation.

The following shall be incidental to the unit price for all storm sewer pipe; "Shoring or Extra Excavation Class B," "Structure Excavation Class B Incl. Haul", "Gravel Backfill for Pipe Zone Bedding," "Gravel Backfill for Pipe Bedding," adjustment of inverts at catch basins, manholes, and fittings for joining dissimilar pipes.

Division 8
Miscellaneous Construction

Erosion Control and Water Pollution Control

Description

Section 8-01.1 is supplemented with the following:

(******)

This work shall consist of installing Temporary Erosion and Sediment Control (TESC) and water management Best Management Practices (BMPs) as shown on the Contract Plans in accordance with these Special Provisions, and all federal, state, and local regulations and permit requirements and as directed by the Engineer or Contracting Agency. The Contractor shall be responsible for all temporary erosion and sediment control and water management measures during construction and until the Notice of Termination is issued to meet all federal, state, local and permit requirements. The Contracting Agency will be responsible for monitoring and measuring turbidity as specified in applicable permits.

(******)

The following is added at the end of this section:

This Work includes seeking coverage under the Washington State NPDES Construction Stormwater General Permit, including submittal of a Transfer of Coverage Form prior to obtaining NTP.

Construction Requirements

General

Section 8-01.3(1) is supplemented with the following:

(******)

All equipment used for in-water work within the existing ordinary high water (OHW) level of Kackman Creek shall use only biodegradable vegetable-based hydraulic fluids. Equipment used outside of the existing OHW is not required to use biodegradable vegetable-based hydraulic fluids.

Equipment used for this project shall be free of external petroleum-based products while working near any surface water or wetland. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tracks, tires, etc.) and undercarriage of equipment prior to working below the OHW. Equipment shall be checked at the beginning of each work shift for leaks, and any repairs shall be completed prior to commencing work activities. No equipment shall be stored overnight within 100 feet of any wetted channel.

Submittals

Section 8-01.3(1)A is supplemented with the following:

(******)
The Contract Plans include TESC, water management, temporary flow bypass, and fish exclusion requirements that represent the minimum required measures. Actual measures will depend on the Contractor's means and methods and construction sequencing. The Contractor shall submit the following plans:

1. SWPPP: This plan shall include narrative and drawings depicting all upland (landward of the Ordinary High Water (OHW) level shown on the Contract Plans) erosion and sediment control methods such as stabilized construction entrances, bark mulch, hog fuel or other ground surfacing for stabilizing access roads, berms or ditches to control surface runoff, silt fence, straw wattles, and the placement of temporary or permanent seeding and mulching for erosion control. A proposed TESC Plan and CSWPPP is provided in the Contract Plans and these Contract Specifications. The Contractor may either use this proposed TESC Plan and CSWPPP provided or shall prepare and submit for approval to the Contracting Agency an alternative Stormwater Water Pollution Prevention Plan (SWPPP) as part of the TESC plan that addresses the requirements of the project's NPDES Permit.

2. Temporary Flow Bypass and Fish Exclusion (FBFE) Plan: This plan shall address all work in close proximity and below the Ordinary High Water (OHW) Line of Kackman Creek including installing sand bags, impermeable liners, ecology blocks, bypassing stream flow with pumping or gravity bypass pipe, dewatering the work area within the OHW, and installing and maintaining all fish exclusion and water quality best management practices to be consistent with project permits and these Contract Specifications.

Water Management
Section 8-01.3(1)C is supplemented with the following:

(******)
Contractor shall provide and maintain TESC measures as required to protect Kackman Creek during construction. If turbidity or sediment from the work area is found to be affecting Kackman Creek or adjacent side channels, sloughs, or streams, which constitutes a violation of any water quality requirements or permit conditions, or as determined by the Engineer, the Contractor shall:

1. Stop work immediately to allow dissipation of turbidity or sediment until water quality returns to within the required parameters.

2. Conduct an inspection of all TESC BMPs to identify any potential problems. Immediately repair and/or replace any BMP found to not be effective.

3. Augment existing BMPs as necessary.

4. Alter work methods and/or means as necessary to prevent any further occurrences of violations in water quality.

5. After performing all of the above, work activities may be continued provided water quality conditions are met.

(******)
Add the following new section:

8-01.3(1)F Work Area Isolation, Dewatering, and Fish Handling

Portions of work on this project are located within the wetted creek channel. It shall be the sole responsibility of the Contractor to manage all surface water and groundwater, and to divert all water around the work areas to completely isolate the work areas from Kackman Creek. All work area isolation, dewatering, and fish handling materials, equipment, and labor will be incidental to other bid items. Work area isolation and any water management for the work areas necessary during ELS construction and inspection shall be incidental to the construction of each ELS. Information about the modeled peak flow rates and water surface elevations for Kackman Creek are summarized below. A schematic of the work area isolation is shown on the Contract Plans as a guide providing the minimum requirements.

Stream flow gauge data is not available for Kackman Creek. Estimates using the USGS peak flow regression relationships indicate the 2-year and 100-year recurrence peak flow rates are 28 cubic feet per second (cfs) and 93 cfs, respectively. May peak flows are expected to be 3 cfs based on WDFW regression equations for fish passage. At a minimum, the Temporary Flow Bypass and Fish Exclusion System should be prepared to bypass flows up to the May Peak flow over extended periods of time. Base flows (or sustained stream flows driven by groundwater and not runoff from precipitation events) during construction will likely generally be much lower than these peak flow estimates. However, baseflows vary between seasons and from year to year and creek flows can rise quickly during rainstorms. Some rainstorms should be anticipated during construction. It is critical for the Contractor to monitor weather forecasts and be flexible and proactive in implementing flow bypass systems, fish exclusion, and management of the dewatered stream channel to accommodate potential storm flows during the project work.

A schematic of the work area isolation is shown on the Contract Plans as a guide providing the minimum requirements for temporary flow bypass measures. The Contractor will include specific details of its proposed plan as part of the Temporary Flow Bypass and Fish Exclusion Plan submittal based on the Contractor’s schedule, work sequencing, and means and methods.

Groundwater can be expected and should be anticipated to be encountered at any time the existing ground is disturbed within the project area. Likewise, dewatering may be needed to perform work in and around the existing creek channel for the construction of ELSs adjacent to the creek. If dewatering is necessary, waters removed from construction work areas shall be pumped to upland dewatering areas approved by the Engineer. Removed waters shall not be discharged back to Kackman Creek or any other surface water body unless approved by the Engineer or the Contracting Agency. The Contractor may place the lower logs of the ELSs “in-the-wet” to minimize water management costs provided the work area is completely isolated from fish and creek flow and the water is contained within the structure excavation extents. Dewatering for the purpose of inspecting the structure foundation is not required. If working below the water surface, the Contractor shall account for the buoyancy of the wood during placement to ensure that water is not forced or pushed outward of the isolated work area into Kackman Creek.

The Contractor shall be responsible for all labor, materials, equipment, and maintenance for the work area isolation, construction of temporary push up dams, temporary flow by-pass channels, and fish exclusion and fish handling.

Any device used for diverting water or excluding fish shall be equipped with a fish guard to prevent passage of fish into the diversion device pursuant to RCW 77.57.010 and 77.57.070. Pump intakes shall be screened with 3/32-inch mesh to prevent fish from entering the system. The screened intake shall consist of a facility with enough surface area to ensure that the flow velocity through the screen is less than 0.4 feet per second. Screen maintenance shall be adequate to prevent injury or entrapment to juvenile fish and the screen shall remain in place whenever water is withdrawn from Kackman Creek. All costs for providing and maintaining screens shall be incidental to the bid items of the associated construction activity.

Temporary Seeding and Mulching

Temporary Mulching
Section 8-01.3(2)D is supplemented with the following:

(******)

Any straw mulch used within the straw wattles or for covering exposed earth as a temporary erosion control measure shall be derived from harvested wheat or alfalfa plant stalk (no hay from a grass source). The straw shall be seasoned (an air-dried condition) free from noxious weeds, seeds or other undesirable materials prior to loading and delivery to the site. The straw shall be suitable for spreading by mechanical means or by hand methods as a temporary erosion control measure.

The Contractor shall be responsible for providing and placing the straw in areas noted on the Contract Plans and as directed by the Engineer.

Placing Compost Blanket
Section 8-01.3(4) is supplemented with the following:

(******)

Compost blanket shall be placed to a depth of 2 inches over bare soil within seeding and planting areas. Compost shall be Medium Compost per the Standard Specifications. Rake compost smooth and remove clods or debris prior to planting or seeding.

Measurement
Section 8-01.4 is supplemented with the following:

(******)

Temporary Flow Bypass and Fish Exclusion Plan will be measured by Lump Sum.
Temporary Flow Bypass and Fish Exclusion will be measured by Lump Sum.

Reinstating Unit Items with Lump Sum Erosion Control and Water Pollution Prevention
(January 24, 2020 TT SP)

Section 8-01.4(3) is supplemented with the following:

(******)

The bid proposal contains the item “Erosion Control and Water Pollution Prevention,” lump sum and the additional erosion control and water pollution prevention items listed below.

*** ESC Lead ***.

Payment

Section 8-01.5 is supplemented with the following:

(******)

Payment for “Compost Blanket” per square yard shall be complete payment for procuring, placing, and fine grading compost to prepare the surface for planting.

Payment for “Temporary Flow Bypass and Fish Exclusion Plan” per Lump Sum shall be full pay for all work required to prepare, submit for approval, and revise as necessary a thorough Plan suited to site-specific conditions.

Payment for “Temporary Flow Bypass and Fish Exclusion” per Lump Sum shall include all labor, material, equipment, and incidentals required to execute the Temporary Flow Bypass and Fish Exclusion Plan and to adapt the Plan if needed to adequately bypass flows around active instream work areas and preclude fish from being in those work areas.

Roadside Restoration

Description

Section 8-02.1 has the following added to the beginning of the section:

(******)

This work consists of planting area preparation and seeding. Plant materials for the side channel and 100-foot planting buffer for the side channel are not included in this Contract and will be conducted by others following construction. Park improvement and Erosion and Sediment Control planting is included within this contract.

Construction Requirements

Work Plans

Weed and Pest Control Plan

Section 8-02.3(2)B has the following inserted at the beginning of this section:

(******)

All work to prepare, submit, and implement the Weed and Pest Control Plan shall be incidental to and included in the other bid items of work. Prior to drafting the Weed and Pest Control Plan, the Contractor shall meet on site with the Engineer to discuss target weeds and unwanted vegetation on site and the methods for controlling the species. Target weeds may include County-listed noxious weeds or naturalized non-native plants. Methods for controlling each unwanted species shall be proposed in the Weed and Pest Control Plan. The Weed and Pest Control Plan shall include a narrative describing methods and timing of control efforts. Additionally, a hand-marked plan sheet shall be included to show locations of described methods and corresponding schedule for each location. Work shall not commence until the Weed and Pest Control Plan has been approved in writing by the Engineer.

The **Weed and Pest Control Plan** shall identify how the Contractor will address the following requirements:

1. The Contractor shall submit the Weed and Pest Control Plan within 30 days of contract start date.

2. The Contractor shall visually inspect all landscape zones monthly, or as determined by the Engineer to identify potential pest problems. Pest problems include insect, disease, and weed infestations. The presence of a pest does not necessarily mean there is a problem. The Contractor shall keep written records of pests identified and zones where problems may be developing and submit these records to the Engineer upon request. The Contractor shall identify areas where non-chemical integrated pest management control methods shall be implemented.

Plant Establishment Plan
Section 8-02.3(2)C is supplemented with the following:

(******)

All work to prepare, submit, and implement the Plant Establishment Plan shall be incidental to and included in the other bid items of work.

The Plant Establishment Plan shall include a Watering Schedule that defines how the Contractor will ensure adequate watering (summer, autumn, and spring) of all plant materials and seeded areas during the 1-year plant establishment period.

Weed and Pest Control

Chemical Pesticides
Section 8-02.3(3)A will be replaced with the following:

(******)

Pesticides: Pesticides include all herbicides, insecticides, fungicides, and various other substances used to control pests. Kackman Creek is a pesticide free management area. Notify the Project Representative of all positive pest identifications. Contractor will not apply any pesticides unless approved and instructed by the Project Representative.

Project Area Weed and Pest Control
Section 8-02.3(3)B is supplemented with the following:

(******)
All plant species listed as noxious weeds in Snohomish County will be controlled within the project limits. The site may also include other invasive and competitive vegetation, as determined by the Engineer, which shall be controlled as ordered by the Engineer.

Noxious weeds and pest vegetation on this project may include, but is not limited to, the following:

1. Himalayan blackberry *(Rubus discolor, R. procerus or R. armeniacus),*
2. Reed canarygrass *(Phalaris arundinacea),*
3. Ornamental Jewelweed (*Impatiens glandulifera*)

This list of pest vegetation is not a complete list of weeds to be controlled within the project limits. The site may also include other unwanted invasive or competitive vegetation, as determined by the Engineer, which shall be controlled as recommended by the Washington State Noxious Weed Program (http://www.nwcb.wa.gov/) or as ordered by the Engineer. The Contractor shall identify all target weeds, specific to the site, to be controlled in the Weed and Pest Control Plan in accordance with Section 8-02.3(2).

All weeds and invasive plants contained within the clearing limits as shown on the Contract Plans shall be removed per Section 2-01(Clearing, Grubbing, and Roadside Cleanup).

Roadside Seeding, Lawn and Planting Area Preparation

Planting Area Preparation
Section 8-02.3(5)C is supplemented with the following:

(******)
Protect existing native vegetation during all planting area preparation. Planting will occur only within graded areas, bare areas, coir lifts, and around existing native vegetation. Planting areas shall be decompacted to a minimum depth of 12 inches and cleared of weeds prior to plant installation.

Cultivation of the soil shall be accomplished by techniques and suitable equipment as defined in the **Plant Establishment Plan** and approved by the Engineer. This operation shall be accomplished at right angles to the natural flow of water on the slopes unless otherwise ordered by the Engineer. All cost and expense incurred in performing the specified work shall be considered incidental to other bid items. Do not cultivate soil within the Critical Root Zone (CRZ) of any mature trees or areas of existing vegetation to be retained, as indicated in the Drawings. The CRZ is defined as a minimum of 12 inches (1 foot) multiplied by the inches diameter at breast height (dbh) of a tree. Any exposed tree roots in cut slopes shall be neatly pruned at the finished grade and the cuts treated with an approved sealer. Do not drive over cultivated soils with heavy equipment prior to planting.

For the Riparian Forest Zone and Erosion Control Seeding areas outside of the Coir Lift Zone shown in the Contract Plans, prepare seeding areas as follows:

1. Decompact and cultivate soils to a minimum depth of 8 inches according to methods defined and approved within the **Plant Establishment Plan**.
2. Submit seeding areas soils for testing and provide a Soil Fertility and Soil Amendment Report. Prior to planting, furnish a soil fertility analysis of existing soils performed by a certified testing lab. Prior to planting, adjust soil amendment and fertilizer applications as recommended by the soil amendment report for native vegetation planting and as approved by the Owner or Contracting Agency. For sampling method, take five samples per acre of each soil type. Mix the samples into one test sample containing approximately 1 quart of soil for each soil type. Furnish map of soil test locations and soil fertility test results that provide information on available nutrient content and fertility status of the soil.
3. Amend onsite soils according to recommendations of Soil Fertility and Soil Amendment Report for native vegetation planting, using fertilizers and amendments consistent with Section 8-02.3(10).

Seeding, Fertilizing, and Mulching

Seeding and Fertilizing

Section 8-02.3(9)B is replaced with the following:

(******)

The Contractor shall prepare the seeding area in accordance with Section 8-02.3(5)A and apply seed at the rate and mix specified in these Special Provisions. The Contractor shall notify the Engineer within 5 days in advance of any seeding operation and shall not begin the Work until areas prepared or designated for seeding have been accepted. Following the Engineer's acceptance, seeding of the accepted ground surfaces shall begin immediately.

Seeding shall not be done during windy weather or when the ground is frozen, or excessively wet.

areas All areas receiving coir, such as the Areas of Terraced Bank Restoration for Steep Slopes, the Coir Bank Restoration Above Log Structures, the Coir and Rock Bank Restoration Adjacent to Bridge, and Bank Restoration for Shallow Slopes, shall be hand seeded. When seeding by hand, the seed shall be incorporated into the top ¼ inch of soil by hand raking or other method that is allowed by the Engineer.

All areas to be seeded outside of Coir Lifts and coir slopes shall be Hydroseeded. Seed applied as a separate operation using a hydroseeder shall have a tracer added to visibly aid uniform application. The tracer shall be HECP Short-Term Mulch applied at a rate of 200 to 250 pounds per acre and the tracer shall carry the measured specified seeding rate.

Perform hydroseeding according to the following;

Two-Step Operation – use the two-step method for all hydroseeding operations:

Step 1 – Apply seed and tracer. If hydromulch is used as a tracer, apply it at a rate of 500 lbs per acre. Thoroughly mix seeds when more than one kind is to be used.

Step 2 – Apply mulch and tackifier. Hydromulch, if used as a tracer in Step 1, will be included as part of the specified hydromulch rate.

Seeding with Fertilizers and Mulches
Section 8-02.3(9)C is replaced with the following:

(******)
For seeding areas outside of Coir Lifts and coir slopes, mulch shall be hydraulically applied with a Moderate Term mulch at a rate adjusted for variations in slope conditions according to manufacturer's recommendations. Mulch shall be applied during the second pass of a Two-Step Operation, per Section 8-02.3(9)B. Mulch shall comply with material specified in Section 9-14(4)2.

Fertilizer
Fertilizer shall meet the requirements of Section 9.14(4).

Supplement fertilizer application with ProGanics soil amendment, or similar amendment product, at a rate between 3,500 and 5,000 pounds per acre. Soil amendment application rate shall be adjusted according to Soil Fertility and Soil Amendment Report per **Section** 8.02(3)5 and manufacturer's recommendations.

Mulch
Section 8-02.3(11) is supplemented with the following at the end of the first paragraph:

(******)
Apply mulch to plantings above the Ordinary High Water Elevation as shown on the Contract Plans.

Mulch for Seeding Areas will follow Standard Specifications Section 8-02.3(11)A.

Bark or Woodchip Mulch
Section 8-02.3(11)B is replaced with the following:

(******)
Mulch shall be applied to all tree and shrub plantings above Ordinary High Water according to the Contract Plans.

The Contractor shall complete final grading and placement/incorporation of soil amendments within the planting area prior to placement of mulch. Areas receiving bark mulch shall be bare soil, coir matting, or vegetation free before application, except where native trees and other plants are specifically identified in the Contract Plans or designated by the Engineer to be saved and protected.

Bark or wood chip mulch shall be placed to a uniform non-compacted depth of 4 inches over all designated planting areas.

Any contamination of the mulch due to the Contractor's operations shall be corrected to its former condition at no additional cost to the Contracting Agency. Mulch placed to a thickness greater than specified shall be at no additional cost to the Contracting Agency.

The Contractor shall keep plant material crowns, runners, and branches free of mulch at all times.

Plant Establishment

Section 8-02.3(13) Plant Establishment is supplemented with the following:

(******)

Watering: The Contractor shall water plants and seeded areas as required to maintain plants in a healthy, growing condition during the 1-year Plant Establishment period.

Seeded Areas:
Seeded areas shall be watered so as to provide optimum growth conditions for the establishment and maintenance. At a minimum, water to promote germination and healthy establishment. Run-off and puddling of water shall be prevented.

Planted Areas:

1. Water immediately after planting (same day).
2. Planted areas shall be watered at least once per week during prolonged, hot and dry periods.
3. Watering for planted areas shall, at a minimum, provide the following water quantities:
    a. Conifer trees that are over 4 feet tall, water at a frequency of 10 to 15 gallons weekly during prolonged dry periods.
    b. All shrubs, water at a frequency of 4 to 8 gallons weekly during prolonged dry periods.

Weeding: The Contractor is responsible for control and removal of all non-native, invasive, aggressive, or pest vegetation within the project boundaries throughout the Plant Establishment period.
Replacement: Plants that require replacement shall be documented by the Contractor and a list shall be delivered to the Engineer prior to the Contractor ordering material. The Biologist or Landscape Architect shall be allowed 15 business days to respond to the submittal.
Cleanup: A general cleanup shall be made after work performed by the Contractor at the Project Site during the Plant Establishment period.
Litter Removal: Unless otherwise specified in the Contract, the Contractor shall remove all construction waste, and extraneous landscape materials, to provide a clean appearance of the project site.
Disposal: Remove waste material, including trash, and debris, and legally dispose of them offsite.

Lawn Installation shall be reseeded with seed as originally planted. Such replacement shall be made in the same manner as specified from the original

plantings, during the appropriate seeding season, and in accordance with the measurement and payment section of this Contract Document.
If in the opinion of the Biologist or Landscape Architect, repeat hydroseeding or repair is necessary due to Contractor's negligence, carelessness or failure to provide maintenance, then the Work shall be at the Contractor's sole expense. Repeat hydroseeding or repair required due to factors determined by the Engineer to be beyond the control of the Contractor shall be paid for under the appropriate contract pay items.

(******)
Add the following new section:

8-05 Engineered Log Structures

8-05.1 Description

This work consists of constructing Engineered Log Structures (ELSs) at the locations and in conformity with the lines, elevations, dimensions and orientations shown on the Contract Plans, or as established by the Engineer during construction. ELSs include the Left Bank Log Structure, the Right Bank Log Structure, and the Log Revetment Structure. Detailed drawings and layering plans for the ELSs are provided on the Contract Plans. Their exact location may be adjusted by the Engineer based on site conditions at the time of construction.

Some slash material and racking logs may be obtained by approved project clearing.

8-05.2 Materials

Materials used in constructing each ELS shall meet the requirements of the following sections:

Light Loose Riprap	9-13.1(3)
Wood Material for Engineered Log Structures	9-38

Specifications for chain and associated hardware are included on the Contract Plans.

Furnish and deliver to the project site (and reuse salvaged material as applicable) for construction of each ELS (as applicable) the following: all Type R and Type L key logs; all racking logs; all slash material; all log lashing material and associated hardware; and all riprap needed for the scour protection. Coordinate with the Contracting Agency for delivery of all ELS construction materials furnished by the Contractor. Load, transport and unload all Contractor furnished material to a staging area closest to the work area as shown on the Contract Plans.

. Purchase or procure separately at no additional cost to the Contracting Agency additional key logs, racking logs, slash material or other material required due to breakage, misuse or loss caused by the Contractor beyond a reasonable amount. Incorporate any slash material obtained via salvage from project site clearing activities into the ELSs.

8-05.3 Construction Requirements

8-05.3(1) General

Do not commence construction of an ELS until:

1. The location of the ELS vertical logs are staked by the Contractor and approved by the Engineer;
2. 100% of the ELS work area has been isolated from active flow of the creek where applicable, and fish exclusion activities have been completed within the isolated area;
3. all necessary temporary erosion and sediment control measures, flow bypass measures, and fish exclusion controls are installed, operational and properly maintained;
4. all work area access routes, and material stockpile and staging areas are established,
5. all ELS construction materials have been approved.

Construct each ELS in accordance with the Contract Plans and these Special Provisions. The Contract Plans include log orientations in a sequence of vertical layers. Place wood and backfill material for each layer as detailed in the Contract Plans, or as otherwise designated by the Engineer to adjust for varying log diameters and shapes and site conditions.

8-05.3(2) Excavation

Complete excavation for ELS construction in accordance with Section 2-09 of the Standard Specifications and as modified in these Special Provisions. Design, furnish, and install all temporary shoring needed to complete ELS excavation and to isolate the excavation from actively flowing waters. Remove shoring when the ELS is complete. All excavation associated with the ELSs will be classified as Structure Excavation Class B per Section 2-09. Pumping or draining excavated areas for the purpose of inspecting the excavation foundation (i.e., the bottom of the excavation) is not required. Manage water in the excavation as needed to ensure the ELSs are constructed as shown on the Contract Plans and that water quality permit requirements are not violated. All excavation necessary for ELS construction shall be included in and be incidental to construction of the ELS and will not be measured and paid for separately. Topsoil, sands, gravels, cobbles, boulders and ground water will be encountered during ELS excavation.

Excavated materials suitable for use as backfill or Selected Material shall be segregated and temporarily stockpiled for future placement as Selected Material as specified in Section 2-03.3(10). Excavated materials deemed by the Engineer as unsuitable for use as Selected Material shall be combined with other unsuitable excavation material and disposed of off-site as directed by the Engineer. For bidding purposes, this unsuitable material generated from the Class B structure excavation shall be included in the bid item “Haul”.

8-05.3(3) Placement of Materials

Following excavation, complete wood and backfill material placement, log lashing installation, and scour rock placement as shown on the Contract Plans, and as described below.

Key logs shall be placed such that direct contact is made with other key logs in a manner that the upper (higher elevation) key log acts to pin down the lower key log. Place key logs with ends protruding outside of the ELS core to help hold racking logs tightly against the ELS.

Coordinate with the Engineer before placing racking logs, salvaged logs and slash material for each layer in the ELSs. Place racking logs, salvaged logs, slash material, and backfill material consisting primarily of ballast rock and Selected Material around the key logs for each layer per the ELS details and layering plans included on the Contract Plans. Ballast rock and Selected Material shall be compacted using Method D (per Section 2-03.3(14)C of these Special Provisions) to minimize voids and to ensure no void spaces exceed 2 inches. Place slash material along the top and waterward face of each ELS at the interface of the backfill material and the racking logs to prevent bleeding of the finer backfill material out of the ELS.

Logs in the lower layers of each ELS may be placed “in-the-wet”, but only after the ELS work area is completely isolated from surface flow of adjacent open water per the approved FBFE Plan and fish have been removed from the work area. When working below the water surface, account for the buoyancy of the wood material during placement to ensure it is placed at the locations and in conformity with the elevations, dimensions, and orientations shown on the Contract Plans. If dewatering is required to place logs in the ELS it shall be incidental to the construction of the ELS.

Chain lashing shall be maintained in a tensioned state following installation. Ensure all chain lashings are in contact with the sapwood; no portion of the chain shall be in contact with bark.

ELSs include constructing a buried toe scour countermeasure under and around the periphery of the ELS using Light Loose Riprap. Place riprap to the dimensions and elevations shown on the Contract Plans or as designated by the Engineer. Fill and compact voids amid large riprap stones with smaller riprap stones and native excavated spoils in such a way that results in a well graded and compacted mass.

Placement of the ELS construction materials described in this section shall be included in and be incidental to construction of each ELS and will not be measured and paid for separately.

8-05.3(4) ELS Inspection

The Engineer will inspect placement of each layer of key logs of an ELS including all lashings before placing racking logs, slash material and backfill material. The Engineer will also inspect placement of racking logs and slash material. Provide 48 hours advance notice before any required inspection. Make all adjustments in the log placements or other components as designated by the Engineer. The Contractor shall anticipate that adjustment to orientation and arrangement will be needed because of irregularities of natural logs, and that additional payment for such adjustments will not be made. If dewatering is required to allow inspection it shall be considered incidental to the construction of the ELS.

8-05.3(5) Wood Material Inspection, Storage, and Handling

Coordinate with the Contracting Agency and Engineer to have all wood material furnished by the Contractor inspected and approved before its delivery to the project site staging area. The Contractor may deliver imported wood material to the project site staging area before the Engineer's acceptance of this material; however, any wood material not accepted by the Engineer after delivery because of damage or nonconformity with these Contract Specifications shall be removed from the project site at the Contractor's own expense. Wood material salvaged from onsite clearing activities may be placed in an ELS if it conforms to Section 9-38 of these Special Provisions and is approved by the Engineer.

Deck/stack separately and store in the Contractor's staging area all wood materials for inspection by the Engineer before placing them in the ELSs. Paint on all key logs the log type identification in a place easily visible for inspection by the Engineer using lead-free, blaze-orange, survey marking paint.

Take special care when storing and handling all wood materials to protect them from damage. Replace at no expense to the Contracting Agency any wood material damaged during storage and handling activities. The Engineer may reject wood material because of damage or nonconformity with these Special Provisions.

8-05.3(6) Branding and Tagging Type R and Type L Key Logs

In accordance with the Revised Code of Washington (RCW) 77.85.050, brand and tag each Type R and Type L key log before installing it in the ELS. Place the tag on the smallest end of each Type R and Type L key log. Furnish branding hammers, tags, and fasteners. Tag fasteners shall be stainless steel or galvanized. Submit samples of tags and fasteners to the Engineer for approval before placement. Coordinate with Engineer or Contracting Agency before purchasing tags to establish a log identification numbering system that will be stamped into the tags by the tag supplier.

8-05.4 Measurement

ELSs will be measured per each installed in accordance with the requirements of the Contract Plans and these Special Provisions. Approximate construction quantities for each ELS are included on the Contract Plans. Actual excavation quantities will vary for each ELS based on the Contractor's excavation and construction means and methods, and the type, location and elevation of each ELS.

Surplus Type L1 logs delivered to the project site by the will be measured per each log approved by the Engineer for use in the ELSs.

8-05.5 Payment

Payment will be made in accordance with Section 1-04.1 for the following Bid Items that are included in the Proposal:

"Bank Log Structure", per each.
"Log Revetment Structure", per each.

The unit Contract price for each ELS shall be full pay for all materials, labor, tools, equipment, and supplies necessary for the excavation, water management, work area isolation, fish exclusion, temporary access, assembly, backfilling, and construction of the

ELS as shown in the Contract Plans and described in these Special Provisions. Payment for excavation; furnishing, transporting, handling and placing key logs, racking logs, and slash material; placement and compaction of backfill material; furnishing and installing lashing and associated hardware; furnishing, transporting, and placement of riprap for scour protection; and grading and restoration of floodplain areas disturbed by ELS construction, shall be incidental to the unit Contract price for each type of ELS.

Division 9
Materials

Riprap, Quarry Spalls, Slope Protection, and Rock for Erosion and Scour Protection and Rock Walls

Riprap and Quarry Spalls

Section 9-13.1(1) is replaced with the following:

(******)

Riprap shall consist of broken stone and shall be free of rock fines, soil, or other extraneous material. Concrete rubble will not be accepted.

The grading of the riprap shall be determined by the Engineer by visual inspection of the load before it is dumped into place, or, if so ordered by the Engineer, by dumping individual loads on a flat surface and sorting and measuring the individual rocks contained in the load. Should the riprap contain insufficient spalls, as defined in Section 9-13.1(5), the Contractor shall furnish and place supplementary spall material.

Riprap and quarry spalls shall be free from segregation, seams, cracks, and other defects tending to destroy its resistance to weather and shall meet the following test requirements:

Aggregate Property	Test Method	Requirement
Degradation Factor	WSDOT Test Method T 113	15 minimum
Los Angeles Wear, 500 Rev.	AASHTO T 96	50% maximum
Specific Gravity, SSD	AASHTO T 85	2.55 minimum

Erosion Control and Roadside Planting

Material Submittals and Acceptance

Section 9-14.1 is supplemented with the following:

(******)

Standard Specification Section	Material	For each material used the Contractor shall submit a materials certificate of compliance in accordance with Section 1-06.2 along with the following information to the Engineer
9-14.6(2)D	Woven Coir Blanket	Test results documenting that the Woven Coir Blanket meets the requirements of this section.
9-14.6(2)D	Non-woven Coir Blanket	Test results documenting that the Non-woven Coir Blanket meets the requirements of this section.
9-14.6(2)D	Wood Stakes	Compliance with the applicable section.

Topsoil

Topsoil Type A

Section 9-14.2(1) is replaced with the following:

(******)

Topsoil Type A shall be a blend of 65 percent sandy loam and 35 percent plant-based compost delivered from a source pre-approved by the Contract Agency.

Blended soil shall contain a minimum of 10% organic content by weight.

Loam shall meet the following particle size distribution thresholds:

Loam Specification			
Sieve	**Size**		**Percent Passing**
3/4"			100 %
1/2"			98%
1/4"		Gravel	85%
#10	2 mm	Very coarse sand	70%
#18	1 mm		50%
#30	0.595 mm	Coarse sand	40%
#60	0.25 mm		40%
#100	0.15 mm	Fine sand	25%
#200	0.073 mm	Very fine sand	<30%
#270	0.053 mm	Silt	<25%
2um	0.002 mm	Clay	<20%

Compost shall be meet criteria within Section 9-14.5(8).

Topsoil Type B

Section 9-14.2(2) is replaced with the following:

(******)

Topsoil Type B shall be native topsoil taken from within the project limits either from the area where stream excavation is to be performed. In the production of Topsoil Type B, all native vegetative matter, less than 4 feet in height, shall be blended to become a part of the topsoil.

Seed

Section 9-14.3 is replaced with the following:

(******)

Furnish seed meeting the following requirements:

a. Label - Deliver all seed in standard, sealed containers. Label each container with the following:
   - The kind and variety of each seed of 3 percent or more in a mixture, by weight. Be sure that seed mix labels include the words "mixture" or "mixed seed" when the seed is a mixture

- The country or state where the seed is grown
- The lot number or other lot identification
- The total percentage, by weight, of other crop seed
- The total percentage, by weight, of weed seed
- The total percentage, by weight, of inert matter
- Statement of "No Noxious (weed) Found"
- For each named seed:
- Percentage of germination
- Percentage of hard (non-living) seed, if more than 1 percent
- Percent of PLS for each kind of seed
- Percent and kind of other crop
- Month and year of seed test
- Net weight of contents
- Name and address of seed labeler or seller
- Origin for each seed (state or foreign country)
- If seed inoculant is used, the claimed date that inoculant effectiveness ends
- For treated seeds (if any):
- Statement that the seeds have been treated
- Name of all chemical used in the treatment
- Description process used in the treatment
- Warning statement for all residual chemicals used
- Net weight of each container
- For seeds listed as native, date and location of collection of source (first generation) seed
- For native seeds specified to be collected for direct use on a project, label containers with the date and location of collection sites for each seed species

b. Quality - Furnish seed meeting the following requirements:
   - The seed and labeling complies with Washington Seed Law and Federal Seed Act.
   - The seed has been tested within 18 months of the planting date.
   - The seed is not sprouted, moldy, or showing evidence of having been wet or otherwise damaged.

c. Pure Live Seed - Obtain the amount of seed to apply by using the purity and germination percentages from the label on actual bags of seed to be used on the Project.

   To calculate the amount of seed to be applied:
   - Obtain the PLS factor - Multiply the seed label germination percentage times the seed label purity percentage.
   - Divide the specified PLS rate by the PLS factor.

     Example: A PLS seeding rate of 10 pounds per acre is specified. The seed label shows a purity of 80 percent and germination is 90 percent. After converting percentages to decimals, 0.80 x 0.90 equals a factor of 0.72. The specified PLS rate, 10 pounds per acre, divided by the factor of 0.72 equals 13.88. In order to meet a PLS seeding rate of 10 pounds per acre, about 14 pounds of seed needs to be applied per acre. For a seed mix, make this calculation for every seed to obtain the total amount to be applied.

d. Inspection - Each lot of seed is subject to inspection upon delivery to the Project. Seed that is not labeled or that does not conform to the Specifications will be rejected and shall be replaced at no additional cost to the Agency.

e. Mixes - Furnish seed mixes that meet the labeling, quality and inspection requirements stated above. Submit all other proposed seed or seed mixes for consideration and

receive written approval before seeding Work begins. Replace rejected seed before planting.

f. Availability - Provide a list of seed sources for all specified seeds within 60 Calendar Days after execution of the Contract. Verify that all specified seed has been located and will be available for use on the Project.

All seeding areas shall be seeded as shown on the Contract Plans. The seed mix is composed of the seed species listed in the table below. Seed of the following composition, proportion, rate, and quality shall be applied on the following types of areas:

Erosion Control Seed Mix

Seed of the following composition, proportion, and quality shall be applied at a rate of 69.1 pounds per acre on areas requiring seeding:

Kind and Variety of Seed in Mixture		Percent Species Composition	PLS Pounds per Acre
Bromus carinatus	California brome	12.0%	4.9
Chamerion angustifolium	Common Fireweed	30.0%	.007
Deschampsia cespitosa	Tufted hairgrass	15.0%	4.9
Elymus glaucus	Blue wildrye	20.0%	3.6
Festuca rubra	Red fescue	13.0%	49.8
Lupinus polyphyllus	Bigleaf lupine	7.0%	0.04
Triticum aestivum	Regreen wheatgrass	3.0%	5.8
Total		**100%**	**69.1**

Fertilizer

Section 9-14.4 is replaced with the following:

(******)

Furnish 1,500 pounds per acre granular slow release all natural organic fertilizer with no chemical content, consisting of a fungal and bacterial biomass. The nutrient source shall be derived from fermented plant material along with nutrients such as cottonseed meal, soybean meal and trace elements all under constant sterile conditions with a minimum Nutrient (N-PK) content of 7-2-1. Furnish fertilizer with organic matter greater than 85 percent, carbon/nitrogen ratio of 5:1, nitrogen (total) greater than 7 percent. Furnish fertilizer containing a maximum of water-soluble nitrogen of 0.5 percent, phosphorus (P205) 2 -4 percent, potassium (K20) 1percent, and a pH level of 6.5 -7.5. Nutrients shall be derived from fermented plant material and not contain any urea, animal waste, animal by-products or sewage material.

Biosol is a manufacturer that provides an equivalent product as specified.

Mulch and Amendments

Hydraulically Applied Erosion Control Products (HECPs)

Section 9-14.5(2) is replaced with the following:

(******)

Hydromulch From Cellulose or Wood Fiber

Furnish mulch Materials free of all weed or plant seeds and containing no substance detrimental to plant life. Furnish mulch meeting the following requirements:

Cellulose fiber from virgin wood or paper product from the QPL. Furnish wood processed so the fibers remain uniformly suspended under agitation in water and the fibers have moisture-absorption and percolation properties. Ship hydromulch in packages of uniform weight, ± 5 percent, and labeled with the manufacturer's name and air-dry weight. Include enough green dye tracer so applied mulch is easily visible.

Dye or tracer shall be nontoxic to plants, animals, and aquatic life and shall not stain concrete or painted surfaces.

Bark or Wood Chip Mulch

The second paragraph of Section 9-14.5(3) is replaced with the following paragraph:

(******)

Wood mulch must be untreated chipped bark or untreated chipped tree prunings a maximum 3 inches long and must be free of twigs, branches, thorns, dirt, grass, yard clippings, soil, weeds, or poisonous plants.

Compost

Section 9-14.5(8) is replaced with the following:

(******)

Compost products shall be the result of the biological degradation and transformation of plant-derived materials under controlled conditions designed to promote aerobic decomposition. Compost shall be stable with regard to oxygen consumption and carbon dioxide generation. Compost shall be mature with regard to its suitability for serving as a soil amendment or an erosion control BMP. The compost shall have a moisture content that has no visible free water or dust produced when handling the material.
Compost production and quality shall comply with Chapter 173-350 WAC.

Compost shall be certified in compliance with U.S. Composting Council Seal of Testing Assurance (STA) program "Fine" compost

Maximum particle length shall be 4 inches for Fine Compost.

The carbon to nitrogen ratio (C:N) shall be between 15:1 and 25:1.

pH shall be between 6.0 and 8.5 determined by TMECC 04.11-A, "1:5 Slurry pH".

Physical contaminants, defined in WAC 173-220 (plastic, concrete, ceramics, metal, etc.) shall be less than 0.5 percent by weight as determined by TMECC 03.08-A "Classification of Inerts by Sieve Sizes". Plastic film shall be less than 0,25 by weight.

Add the following new section:

9-14.6(2)D Coir Blanket:

Coir fabric used in Coir Lift Construction shall consist of an outer woven coir blanket and an inner non-woven coir blanket according to the following requirements in minimum roll widths of 2.5 meters (8 feet). Coir fabric used in areas of Bank Restoration for Shallow Slopes shall meet the following requirements for Woven coir blanket.

Woven coir blanket:

Woven coir blanket shall meet the following requirements:

1. 100 percent biodegradable coconut fiber strands (coir), uniformly twisted and woven into a flexible fabric.
2. Density of no less than 700 grams per square meter as determined by ASTM D3776 with an open area of no more than 50% and a tensile strength (dry) of no less than 0.5 KN/in machine direction strength/0.20 KN/in cross direction strength.
3. Several manufacturers provide equivalent products for woven 700 coir temporary erosion control blanket as specified:
   a. RoLanka BioD-Mat 70
   b. DeKoWe 700

Non-woven coir blanket:

Non-woven coir blanket shall meet the following requirements:

1. 100 percent biodegradable coconut fiber strands (coir), held together with organic netting sewn with organic thread on 1.5-inch centers.
2. Density of no less than 280 grams per square meter as determined by ASTM D3776.
3. Several manufacturers provide equivalent products for non-woven inner coir temporary erosion control blanket as specified:
   a. RoLanka BioD-OCF
   b. Palm Fiber CF-072B

Other coir blanket fabrics will be considered provided their properties meet or exceed those of the approved products.

Wood Stakes:

All wood stakes used for installation of coir blankets shall be 2-inch by 2-inch by 18-inch long wood stakes spaced at 3 feet on center unless specified otherwise in the Contract Plans.

(******)

Add the following new section:

9-37 Chain and Wire Rope

9-37.1 Description

Chain and connecting hardware identified in the Contract Plans and Section 8-05 of these Special Provisions will be supplied by the Contractor. Chain shall be installed per the Contract Plans.

(******)

Add the following new section:

9-38 Wood Material for Engineered Log Structures

9-38.1 Description

9-38.1(1) Type R_Key Logs (Logs with Rootwads)

Type R_ Key Logs shall be derived from coniferous trees such as Western Red Cedar or Douglas Fir. Western Hemlock or Sitka Spruce logs may also be used subject to approval by the Engineer. Type R_ Key Logs shall consist of a trunk section with a natural, large, full, intact, and complex rootwad structure containing multiple branches (roots) extending outward around the entire circumference of the rootwad structure. If in the opinion of the Engineer upon inspection that a Type R_ Key Log has a sparse or otherwise compromised root structure, said log will not be accepted by the Engineer as a Type R_ Key Log, but it may be acceptable as a Type L_ Key Log (Log without Rootwad) upon approval by the Engineer. Acceptable Type R_ Key Logs shall be clean of excessive soil, of sound quality, and free of cracks, checks, splits, insects, rot, or decay. No more than 50%, by surface area, of the bark shall be missing from Type R_ Key Logs at their time of placement.

Type R_ Key Logs shall conform to the size requirements shown on the Contract Plans where the minimum diameter specified refers to the diameter of the trunk section measured within 4 feet from the base (not the end or bottom) of the rootwad structure. Type R_ Key Logs shall have a minimum diameter from tip-to-tip of the multiple branch root structure of 4 to 6 feet for an 18-inch minimum diameter log, and 6 to 8 feet for a 24-inch minimum diameter log. The length specified on the Contract Plans for Type R_ Key Logs shall be measured from the end (or bottom) of the root structure to the other cut end (tip) of the log. The minimum tip diameter of the log shall not be less than one-half the actual measured diameter of the trunk section measured within 4 feet from the base (not the end or bottom) of the rootwad structure.

9-38.1(2) Type L_Key Logs (Logs without Rootwads)

Type L_ Key Logs shall be derived from coniferous trees such as Western Red Cedar or Douglas Fir. Western Hemlock or Sitka Spruce logs may also be used subject to approval by the Engineer. Acceptable Type L_ Key Logs shall be of sound quality, with a maximum taper of 1.5-inch per 10 feet of log length, and free of cracks, checks, splits, insects, rot, and decay. No more than 50%, by surface area, of the bark shall be missing from Type L_ Key Logs at their time of placement.

Type L_ Key Logs shall conform to the size requirements shown on the Contract Plans where the specified minimum diameter refers to the diameter measured within 4 feet of the largest cut end (butt) of the log. The length specified on the Contract Plans for Type L_ Key Logs shall be measured from the smaller cut end (tip) of the log to the butt of

the log. The minimum tip diameter of the log shall not be less than one-half the actual measured diameter within 4 feet of the butt of the log.

9-38.1(3) Racking Logs

Racking Logs may be from a mix of coniferous and deciduous trees with or without rootwads. A minimum of 50% of Racking Logs shall be from coniferous trees. Racking Logs shall be of sound quality and free of cracks, checks, splits, insects, rot, and decay. No more than 25%, by surface area, of the bark shall be missing from Racking Logs at their time of placement.

Racking Logs shall be 15 to 20 feet in length, and their length shall be measured as described above for Type R_ and Type L_ Key Logs for Racking Logs with and without rootwads, respectively. Diameters of Racking Logs shall vary from 4 to 12 inches as measured at the largest cut end. Racking Logs placed in ELSs shall have the following size class percentages:

30% - 8 to 12 inches in diameter
70% - 4 to 8 inches in diameter

9-38.1(4) Slash Material

Slash Material shall be comprised of immature trees, saplings, roots, limbs, branches, brush and treetops generated during land clearing activities. Slash Material may be of various sizes less than 4 inches in diameter and shall be derived only from coniferous tree species; slash derived from deciduous tree species will not be allowed. Slash Materials shall not contain cobbles nor invasive species. Slash Material passing a 4 inch sieve shall not exceed 10% of the total slash material by volume and shall not contain silty or clayey material that could cause turbidity when placed in water.

The following appendices are attached and made a part of this contract:

APPENDIX A:
Contract Plans

APPENDIX B:
Temporary Erosion and Sediment Control (TESC) and Construction Stormwater Pollution Prevention Plan (CSWPPP)

APPENDIX C:
Cultural Resources Report, Monitoring and Inadvertent Discovery Plan

APPENDIX D:
Geotechnical Report

APPENDIX E:
Permits

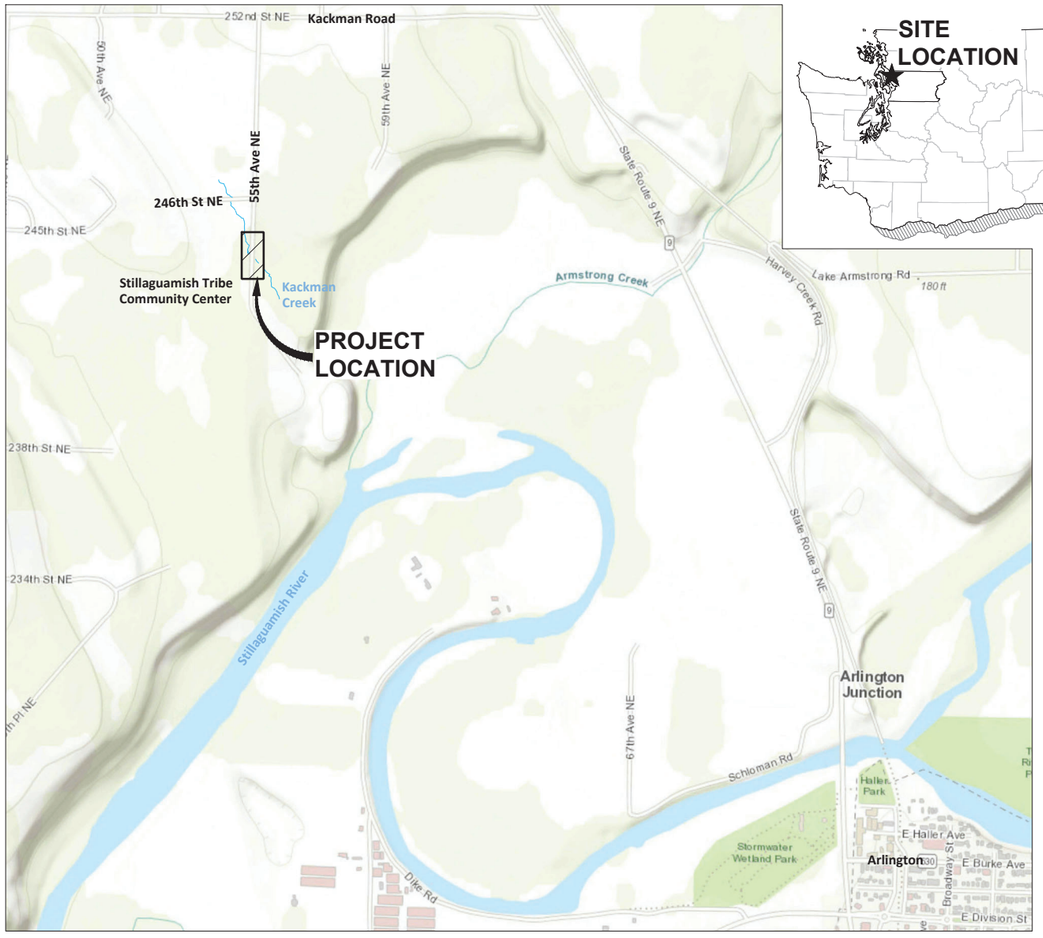
APPENDIX F:
Standard Plans

APPENDIX A

Contract Plans

KACKMAN CREEK CULVERT REPLACEMENT WITH A NEW 110 FT BRIDGE AT 55TH AVE NE

SNOHOMISH COUNTY, WASHINGTON



VICINITY MAP

SCALE: 1" = 800'

OWNER:

STILLAGUAMISH TRIBE OF INDIANS
P.O. BOX 277
ARLINGTON, WA 98223
PHONE: (360) 572-3026
CONTACT: CBOSER@STILLAGUAMISH.COM
CKIRK@STILLAGUAMISH.COM

CIVIL/STREAM ENGINEER:

HERRERA ENVIRONMENTAL CONSULTANTS
2200 SIXTH AVENUE
SUITE 1100
SEATTLE, WA 98121
PHONE: (206) 441-9080
CONTACT: CHRISTINA AVOLIO, PE
IAN MOSTRENKO, PE

STRUCTURAL/BRIDGE ENGINEER:

TRANTECH ENGINEERING, LLC
365 118TH AVENUE SE
SUITE 100
BELLEVUE, WA 98005
PHONE: (425) 453-5545
CONTACT: KHASHAYAR NIKZAD, PE, SE

GEOTECHNICAL ENGINEER:

ASPECT CONSULTING, LLC
907 HARRIS STREET
SUITE 301
BELLINGHAM, WA 98225
PHONE: (360) 746-8964
CONTACT: ERIK ANDERSEN, PE

CIVIL/ROAD ENGINEER:

TRANTECH ENGINEERING, LLC
1221 FRASER STREET
SUITE E-3
BELLINGHAM, WA 98229
PHONE: (360) 255-2563
CONTACT: TOM WELLER, PE

SURVEYOR:

PACIFIC SURVEYING AND ENGINEERING INC.
1812 CORNWALL
BELLINGHAM, WA 98225
PHONE: (360) 671-7387
CONTACT: ADAM MORROW, PLS

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TRANTECH Engineering LLC

Aspect CONSULTING

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STILLAGUAMISH stulǝgʷaʔbš VILLAGE

HERRERA

IAN B. MOSTRENKO STATE OF WASHINGTON 36069 REGISTERED PROFESSIONAL ENGINEER 02/03/20

DESIGNED: I. MOSTRENKO	DRAWN: E. MARSHALL
DESIGNED: C. AVOLIO	DRAWN:
DESIGNED:	CHECKED: M. EWBANK
SCALE:	APPROVED: I. MOSTRENKO

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

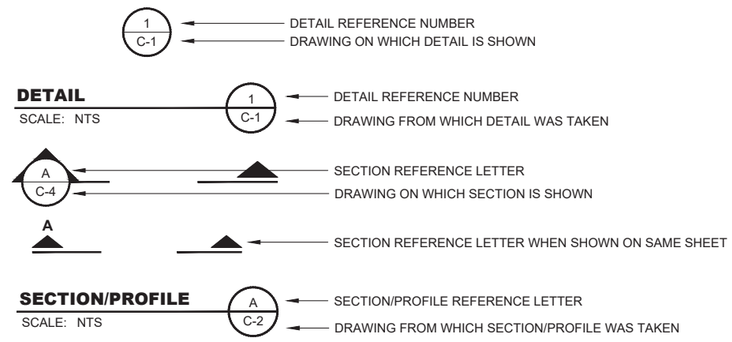
TITLE SHEET, VICINITY MAP, AND SHEET INDEX

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: G0.01
SHEET NO: 1 OF 61

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ABBREVIATIONS

A	ALGEBRAIC DIFFERENCE
APPROX	APPROXIMATE
ABUT	ABUTMENT
ACP	ASPHALT CONCRETE
AVE	AVENUE
BOC	BACK OF CURB
BMP(S)	BEST MANAGEMENT PRACTICE(S)
BFS	BEGINNING FULL SUPERELEVATION
BNC	BEGINNING NORMAL CROWN
BOT	BOTTOM
BR	BRIDGE
BRG	BEARING
BTWN	BETWEEN
BVCS	BEGIN VERTICAL CURVE STATION
BVCE	BEGIN VERTICAL CURVE ELEVATION
C&G	CLEARING AND GRUBBING
CB	CATCH BASIN
CESCL	CERTIFIED EROSION AND SEDIMENT CONTROL LEAD
CIP	CAST IN PLACE
CL	CLASS
C/L	CENTERLINE
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCT
CP	CONTROL POINT
CSBC	CRUSHED SURFACING BASE COURSE
CSTC	CRUSHED SURFACING TOP COURSE
CTR	CENTER
CY	CUBIC YARD
DESC	DESCRIPTION
DET	DETAIL
DIAM., Ø	DIAMETER
DIM	DIMENSION
DPW	DEPARTMENT OF PUBLIC WORKS
DWG(S)	DRAWING(S)
DWL	DOWEL
E	EAST/EASTING
EA	EACH
EFS	END FULL SUPERELEVATION
EG	EXISTING GROUND
EL, ELEV.	ELEVATION
ENC	END NORMAL CROWN
EOP	EDGE OF PAVEMENT
EQ	EQUAL
ESC	EROSION & SEDIMENT CONTROL
EVCS	END VERTICAL CURVE STATION
EVCE	END VERTICAL CURVE ELEVATION
EX, EXIST	EXISTING
EXT	EXTERIOR
FDN	FOUNDATION
FG	FINISH GRADE
FOC	FACE OF CURB
FT	FOOT, FEET
GALV	GALVANIZED
GIR	GIRDER
HDPE	HIGH DENSITY POLYETHYLENE
HMA	HOT MIX ASPHALT
HORIZ	HORIZONTAL
HVF	HIGH VISIBILITY FENCE
IN	INCH, INCHES
INV	INVERT
JT	JOINT
K	LENGTH OF VERTICAL CURVE / PERCENT CHANGE IN A
LB	LEFT BANK
LF	LINEAR FOOT/FEET
LT	LEFT
L.S	LUMP SUM
LVC	LENGTH OF VERTICAL CURVE
MAX	MAXIMUM
MATL	MATERIAL
MH	MANHOLE
MIN	MINIMUM
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
N	NORTH/NORTHING
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NGPA	NATIVE GROWTH PROTECTION EASEMENT
NO	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OHWM	ORDINARY HIGH WATER MARK
PC	POINT OF CURVATURE
PCC	PORTLAND CONCRETE CEMENT
PDS	PLANNING AND DEVELOPMENT SERVICES
PG	PERFORMANCE GRADE
PLS	PURE LIVE SEED
PNT(S)	POINT(S)
PT	POINT OF TANGENT
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
QTY	QUANTITY
R	RADIUS
RB	RIGHT BANK
RDWY	ROADWAY
RE	RIM ELEVATION
REF	REFERENCE
REINF	REINFORCING
REQD	REQUIRED
RT	RIGHT
R/W, ROW	RIGHT OF WAY
SCC	SNOHOMISH COUNTY CODE
SF	SQUARE FEET
SHLD.	SHOULDER
SHT	SHEET
SPEC	SPECIFICATION
STA	STATION
STD	STANDARD
SY	SQUARE YARDS
SYMM	SYMMETRICAL
TEMP	TEMPORARY
TESC	TEMPORARY EROSION & SEDIMENTATION CONTROL
TW	TOP OF WALL
TYP	TYPICAL
V.C.	VERTICAL CURVE
VERT	VERTICAL
VPI	VERTICAL POINT OF INTERSECTION
W/	WITH
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
WSE	WATER SURFACE ELEVATION
WWHM	WESTERN WASHINGTON HYDROLOGY MODEL



"-" INDICATES THAT THE DETAIL/SECTION IS SHOWN ON THE SAME SHEET

"TYP" INDICATES THAT THE DETAIL/SECTION IS UNIFORMLY TYPICAL THROUGHOUT PROJECT EXCEPT WHERE OTHERWISE NOTED

"VAR" SPECIFIES THAT DETAIL/SECTION WAS TAKEN FROM VARIOUS DRAWINGS

NOTE AND DETAIL/SECTION REFERENCING

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HERRERA

IAN B. MOSTRENKO
STATE OF WASHINGTON
56069
REGISTERED
PROFESSIONAL ENGINEER

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DESIGNED: C. AVOLIO	DRAWN:		
DESIGNED:	CHECKED: M. EWBANK		
SCALE:	APPROVED: I. MOSTRENKO		

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

ABBREVIATIONS

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	G1.01
SHEET NO:	2 OF 61

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LEGEND - EXISTING

- MAJOR CONTOUR (100)
- MINOR CONTOUR
- PROPERTY (RECORD) LINE
- RIGHT-OF-WAY
- EASEMENT
- TOP OF BANK
- TOE OF BANK
- ORDINARY HIGH WATER MARK
- OVERHEAD POWER LINE
- CULVERT
- ASPHALT
- WETLAND
- DECIDUOUS TREE
- EVERGREEN TREE

LEGEND - PROPOSED

- DISTURBANCE LIMITS
- GRADING LIMITS
- MAJOR CONTOUR (100)
- MINOR CONTOUR
- SAWCUTTING LIMITS (BMP C152)
- CLEARING AND GRUBBING LIMITS
- GRADING CUT LINE (CUT)
- GRADING FILL LINE (FILL)
- STRAW WATTLES (BMP C235)
- HIGH VISIBILITY FENCE PER WSDOT STD PLAN I-10.10-01 (BMP C103)
- DITCH
- TEMPORARY PIPE SLOPE DRAIN (PSD) 12" Ø (BMP C204)
- RETAINING WALL
- STABILIZED CONSTRUCTION ENTRANCE (BMP C105)
- CLEARING & GRUBBING
- ASPHALT REMOVAL
- HOT MIX ASPHALT CL 1/2" PG 64-22 SURFACING
- GRAVEL SHOULDER
- BRIDGE
- ROCK LINED DITCH

- PRESERVE EXISTING TREE TO DRIP LINE. SEE DETAIL A/C2.02
- SALVAGE & STOCKPILE TREE FOR FUTURE USE. SEE SPECIAL PROVISION 2-02.
- PERMANENT ROCK CHECK DAM (BMP C207)
- TRIANGULAR SILT DIKE (BMP C208)
- INLET PROTECTION (BMP C220)
- OUTLET PROTECTION. SEE DETAIL A/RD1.03
- DRAINAGE FLOW DIRECTION ARROWS (SHEET FLOW, OR SHALLOW CHANNEL FLOW) ON ROADWAY
- DRAINAGE FLOW DIRECTION ARROWS (SHEET FLOW, OR SHALLOW CHANNEL FLOW) OFF ROADWAY
- SIGN
- CP1 CONTROL POINT
- BANK LOG STRUCTURE
- LOG REVETMENT STRUCTURE

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VILLAGE

HERRERA

I.V. B. MOSTRENKO — STATE OF WASHINGTON — 36069 — REGISTERED PROFESSIONAL ENGINEER — 02/03/20

DESIGNED: I. MOSTRENKO	DRAWN: E. MARSHALL
DESIGNED: C. AVOLIO	DRAWN:
DESIGNED:	CHECKED: M. EWBANK
SCALE:	APPROVED: I. MOSTRENKO

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

LEGEND

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: G1.02
SHEET NO: 3 OF 61

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SNOHOMISH COUNTY GENERAL NOTES:

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE APPLICABLE EDITIONS OF THE SNOHOMISH COUNTY ENGINEERING DESIGN AND DEVELOPMENT STANDARDS (EDDS), SNOHOMISH COUNTY CODE, WASHINGTON STATE DEPARTMENT OF TRANSPORTATION/AMERICAN PUBLIC WORKS ASSOCIATION STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, AND THE SNOHOMISH COUNTY DRAINAGE MANUAL.
2. THE PROJECT IS VESTED TO THE 2018 EDITION OF THE SNOHOMISH COUNTY ENGINEERING DESIGN AND DEVELOPMENT STANDARDS. THE CONTRACTOR SHALL KEEP A SET OF THE EDDS ON SITE AT ALL TIMES.
3. ALL WORK PERTAINING TO THIS PROJECT SHALL BE SUBJECT TO INSPECTION BY THE COUNTY INSPECTOR OR HIS DESIGNATED REPRESENTATIVE. PRIOR TO BEGINNING ANY SITE WORK, THE CONTRACTOR SHALL CONTACT THE COUNTY INSPECTOR AT (425) 388-3338 AND SCHEDULE A PRE-CONSTRUCTION CONFERENCE.
4. IF THE PROJECT SITE AS DEFINED IN SCC 30.63A.91S.351 IS MORE THAN ONE ACRE, THE CESCL OR ESC LEADD IDENTIFIED IN THE SWPPP NARRATIVE SHALL BE ON SITE OR ON CALL AT ALL TIMES (SCC30.63A.510).
5. THE CESCL SHALL NOTIFY THE COUNTY INSPECTOR IN WRITING ANY TIME A BMP PROVES TO BE INADEQUATE RESULTING IN AN ACTUAL DISCHARGE OF OR POSES A POTENTIAL TO DISCHARGE A SIGNIFICANT AMOUNT OF ANY POLLUTANT PURSUANT TO SCC 7.53 TO WATERS OF THE STATE OR THE COUNTY'S MS-4 DRAINAGE SYSTEM (SCC30.63A.510). SAID NOTIFICATION SHALL BE MADE WITHIN 24 HOURS OF THE DISCHARGE EVENT OR PROBLEM IDENTIFICATION.
6. IF INDIVIDUALS REVIEWING OR INSPECTING WORK ARE REPLACED DURING CONSTRUCTION, INCLUDING BUT NOT LIMITED TO THE CIVIL ENGINEER, SOILS ENGINEER, CESCL OR THE ENGINEERING GEOLOGIST, WORK REQUIRING THEIR REVIEW SHALL BE STOPPED UNTIL ANOTHER QUALIFIED PERSON AGREES TO ACCEPT RESPONSIBILITY AND NOTIFIES PLANNING & DEVELOPMENT SERVICES IN WRITING (SCC 30.63A.855 AND SCC 30.63B.340(4)).
7. A ROW USE PERMIT IS REQUIRED FROM THE DPW FOR ANY LANE/ROAD CLOSURES WITHIN THE SNOHOMISH COUNTY ROW. CONTACT DPW AT LEAST 15 DAYS PRIOR TO CONSTRUCTION ACTIVITY WITHIN THE PUBLIC ROW. SNOHOMISH COUNTY DOES NOT HAVE JURISDICTION ON STATE ROUTES OR ROADWAYS WITHIN INCORPORATED CITIES, PRIVATE ROADS OR PRIVATE PROPERTY. FOR ANY ACTIVITY ENCROACHING ON SUCH PROPERTY THE APPLICANT SHALL OBTAIN PERMISSION FROM THE APPROPRIATE AUTHORITY.
8. FIELD CHANGES REQUIRING REDESIGN SHALL BE SUBMITTED AND APPROVED PRIOR TO CONSTRUCTION.
9. ENGINEERED RECORD DRAWINGS SHALL BE REQUIRED PRIOR TO SITE APPROVAL (EDDS SECTION 10-05).
10. SURVEY MONUMENTS SHALL BE FOUND AND SET IN ACCORDANCE WITH SNOHOMISH COUNTY ENGINEERING DESIGN AND DEVELOPMENT STANDARDS (EDDS), CHAPTER 4-03, DETAIL 4-130. MONUMENTS AND PROPERTY CORNERS SHALL BE PROTECTED FROM DISTURBANCE DURING CONSTRUCTION. A LICENSED SURVEYOR SHALL OBTAIN A PERMIT FOR REMOVAL OR REPLACEMENT OF ANY ROW MONUMENTS, SURVEY MONUMENTS, OR PROPERTY CORNERS IN ACCORDANCE WITH STATE LAW AND WAC 332-120 PRIOR TO ANY DISTURBANCE TO THE CORNER. THE POINTS TO BE PROTECTED OR REPLACED SHALL BE RELOCATED BY A PROFESSIONAL LAND SURVEYOR AND SHOWN ON THE CONSTRUCTION PLANS.
11. REMOVE ABANDONED PIPES WITHIN THE RIGHT-OF-WAY.
12. ALL PIPES SHALL HAVE A MINIMUM OF 12" COVER AT THE TOP OF THE BELL, OR SHALL HAVE MINIMUM COVER PER THE MANUFACTURER'S SPECIFICATIONS, WHICHEVER IS GREATER. [EDDS 5-05.I.9.]
13. PRIOR TO PLACING ANY SURFACE MATERIALS ON THE ROADWAY, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTING AGENCY OR ENGINEER TO PROVIDE DENSITY TEST REPORTS (AS SPECIFIED IN EDDS) CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF WASHINGTON. [EDDS 8-05.]
14. APPROVED PERMANENT TRAFFIC CONTROL SIGNS AND MARKINGS WITHIN THE PUBLIC RIGHT-OF-WAY (ROW) SHALL BE INSTALLED BY COUNTY FORCES. THE DEVELOPER SHALL PAY FOR INSTALLATION OF ALL DEVICES. THE INSPECTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS (DPW) TRAFFIC OPERATIONS WHEN THE PROJECT IS READY FOR CHANNELIZATION AND SIGNING. IF COUNTY FORCES ARE UNAVAILABLE TO PERFORM THE STRIPING INSTALLATION WITHIN AN APPROPRIATE TIME FRAME, THE PERMIT HOLDER SHALL CONTRACT FOR THE STRIPING INSTALLATION. DPW TRAFFIC OPERATIONS SHALL BE CONTACTED AT LEAST 2 DAYS IN ADVANCE OF INSTALLATION TO VERIFY CHANNELIZATION LAYOUT.
15. DURING PROJECT CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL TEMPORARY CONSTRUCTION SIGNS, TRAFFIC CONTROL SIGNS, DELINEATORS AND TEMPORARY MARKINGS AS REQUIRED. ALL SIGNS, TRAFFIC CONTROL SIGNS, DELINEATORS AND TEMPORARY MARKINGS SHALL BE ACCORDING TO THE CURRENT MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
16. ACCESS BY EMERGENCY VEHICLES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.
17. AFTER WORK WITHIN THE TRAVELED ROADWAY IS COMPLETED AT THE END OF EACH DAY, THE ROAD SHALL BE CLEARED OF DEBRIS AND EQUIPMENT, AND COMPLETELY OPEN TO TRAFFIC (UNLESS OTHERWISE APPROVED BY THE DEPARTMENT OF PUBLIC WORKS OF THE COUNTY). LIGHTED BARRICADES OR BARRELS SHALL DELINEATE ALL AREAS WITHIN THE ROADWAY AFFECTED BY CONSTRUCTION (I.E. EDGE OF PAVEMENT, NEW CURB EDGES NOT ILLUMINATED BY STREET LIGHTS).
18. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE FOR INTERIM TRAFFIC CONTROL DURING CONSTRUCTION ON OR ALONG TRAVELED COUNTY ROADWAYS. THE DEVELOPER/CONTRACTOR MUST SUBMIT A TRAFFIC CONTROL PLAN TO PUBLIC WORKS (PERMIT COUNTER) AND RECEIVE APPROVAL PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION.
19. THE WORKMANSHIP AND MATERIALS FOR ALL UNDERGROUND UTILITY INSTALLATIONS WITHIN THE COUNTY R/W SHALL BE IN ACCORDANCE WITH EDDS SECTIONS 8-02, 8-04, 8-05, 8-09, AND THE MOST RECENT COPY OF THE STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (WSDOT/APWA).

GENERAL CONSTRUCTION:

1. ALL WORK SHALL CONFORM TO THE CURRENT VERSION OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION, SNOHOMISH COUNTY ENGINEERING DESIGN AND DEVELOPMENT STANDARDS (EDDS), AND ALL OTHER APPLICABLE CODES AND STANDARDS UNLESS SPECIFICALLY INDICATED OTHERWISE BY THESE PLANS.
2. IN CASE OF A CONFLICT BETWEEN THE REGULATORY STANDARDS OR SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL PREVAIL.
3. A COPY OF THE APPROVED PLANS SHALL BE ONSITE DURING CONSTRUCTION AT ALL TIMES.
4. CONTRACTOR SHALL NOT COMMENCE WORK UNTIL WRITTEN AUTHORIZATION TO PROCEED HAS BEEN PROVIDED BY OWNER.
5. A PRE CONSTRUCTION MEETING AND A 24-HOUR NOTICE IS REQUIRED PRIOR TO STARTING NEW CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE THE PRE CONSTRUCTION MEETING WITH ALL CONCERNED PARTIES (OWNER AND ENGINEER).
6. CONTRACTOR SHALL OBTAIN ANY AND ALL REQUIRED CONSTRUCTION EASEMENTS AND PERMITS PRIOR TO STARTING CONSTRUCTION.
7. FRANCHISED UTILITIES OR OTHER INSTALLATIONS THAT ARE NOT SHOWN HEREIN SHALL NOT BE CONSTRUCTED UNLESS A PERMIT HAS BEEN ISSUED BY SNOHOMISH COUNTY OR ITS DESIGNATED REPRESENTATIVE AGENCY.
8. APPROVAL OF THESE DRAWINGS DOES NOT CONSTITUTE AN APPROVAL OF ANY OTHER CONSTRUCTION NOT SPECIFICALLY SHOWN. THESE PLANS ARE FOR STANDARD ROAD, BRIDGE, STREAM CHANNEL, DRAINAGE, AND UTILITY IMPROVEMENTS ONLY.
9. CONSTRUCTION NOISE SHALL BE LIMITED IN ACCORDANCE WITH LOCAL CODE; OR 7 A.M. TO 7 P.M. ON WEEKDAYS AND 9 A.M. TO 6 P.M. ON WEEKENDS AND LEGAL HOLIDAYS, WHICHEVER IS MORE STRINGENT.

SITE PREPARATION:

1. THE CONTRACTOR SHALL PREPARE AND IMPLEMENT A SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN (SPCC PLAN) FOR ALL FUELS, PETROLEUM PRODUCTS AND HAZARDOUS MATERIALS, AS DEFINED IN CHAPTER 477 OF THE WSDOT ENVIRONMENTAL PROCEDURES MANUAL. PLAN SHALL INCLUDE IDENTIFICATION OF RESPONSIBLE PERSONNEL, SPILL REPORTING CONTACTS, POTENTIAL SPILL SOURCES, AND SPILL PREVENTION AND SPILL RESPONSES MEASURES.
2. TRAFFIC CONTROL MEASURES SHALL BE EMPLOYED IN ACCORDANCE WITH WSDOT TEMPORARY TRAFFIC CONTROL REQUIREMENTS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERIFICATION OF EXISTING UTILITY LOCATIONS WHETHER OR NOT THESE UTILITIES ARE SHOWN ON THE PLANS. THE CONTRACTOR SHALL EXERCISE CARE TO AVOID DAMAGE TO ANY UTILITY. IF CONFLICTS WITH EXISTING UTILITIES ARISE DURING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EROSION AND SEDIMENT CONTROL INCLUDING PROTECTION OF ALL ADJACENT PROPERTIES FROM SEDIMENT DEPOSITION.
5. PRIOR TO INITIATION OF THE SITE WORK, HIGHLY VISIBLE MARKERS SUCH AS BRIGHT ORANGE BARRIER FENCING SHALL BE USED TO IDENTIFY NGPA BOUNDARIES. PRIOR TO RECORDING, ALL NGPA'S SHALL BE CLEARLY AND PERMANENTLY MARKED ON THE PROJECT SITE. SIGNS SHALL BE PLACED NO GREATER THAN 100 FEET APART AROUND THE PERIMETER OF THE NGPA. NEITHER CLEARING OF ANY VEGETATION NOR GRADING ARE ALLOWED WITHIN THE NGPA AREAS.
6. THE CONTRACTOR SHALL CLEAR, GRUB, AND REMOVE ALL UNSUITABLE MATERIAL FROM THE SITE AS DESCRIBED IN THE CONTRACT DOCUMENTS.

SITE WORK:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SECURITY INCLUDING PROTECTION OF WORK AND SITE AGAINST VANDALISM, THEFT, AND UNAUTHORIZED ACCESS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF ADJACENT UTILITIES WHICH MAY INCLUDE, BUT ARE NOT LIMITED TO, WATER, SEWER, STORM SEWER, POWER, TELEPHONE, CABLE TV, GAS, IRRIGATION, AND STREET LIGHTING. THE CONTRACTOR SHALL NOTIFY RESIDENTS AND BUSINESSES 48 HOURS IN ADVANCE OF ANY WORK AFFECTING ACCESS OR SERVICE AND SHALL MINIMIZE INTERRUPTIONS TO DRIVEWAYS FOR RESIDENTS AND BUSINESSES ADJACENT TO THE PROJECT.
4. ALL LAWN AND VEGETATED AREAS DISTURBED WILL BE RESTORED TO ORIGINAL CONDITION. ANY DISTURBANCE OR DAMAGE TO OTHER PROPERTY ON ADJACENT PARCELS OR IN THE PUBLIC RIGHT OF WAY SHALL ALSO BE REPAIRED OR RESTORED TO ORIGINAL CONDITION.
5. THE CONTRACTOR SHALL PERFORM, PROTECT, AND REPLACE (IF NECESSARY) ALL NECESSARY CONSTRUCTION STAKING.
6. THE CONTRACTOR SHALL IMPLEMENT ALL REQUIRED TRAFFIC CONTROL DEVICES INCLUDING PAVEMENT MARKINGS AND SIGNS PER SNOHOMISH COUNTY STANDARDS AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
7. ALL TRENCH EXCAVATIONS SHALL BE ACCORDING THE SECTION 7-08 OF THE STANDARD SPECIFICATIONS. THE BEDDING SHALL BE ACCORDING TO SECTION 7-08 OF THE STANDARD SPECIFICATIONS.
8. TRENCH EXCAVATIONS SHALL NOT BE LEFT OPEN OVERNIGHT.
9. CONNECT NEW CONSTRUCTION TO EXISTING AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
10. PLUG ALL CULVERTS, SEWERS, AND CONDUITS PRIOR TO ABANDONMENT.
11. MAXIMUM DENSITY AND OPTIMUM MOISTURE FOR ALL GRANULAR MATERIALS SHALL BE DETERMINED BY ASTM D-1557 TEST METHOD.

POST CONSTRUCTION:

1. ALL TEMPORARY EROSION AND SEDIMENT CONTROL BMPS SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED. TRAPPED SEDIMENT SHALL BE REMOVED AND DISPOSED OF PROPERLY.
2. PRIOR TO TEMPORARY OR PERMANENT OCCUPANCY, THE CRITICAL AREAS MITIGATION PLAN SHALL BE FULLY IMPLEMENTED AND RECEIVED APPROVAL FROM A PDS BIOLOGIST.
3. THE CONTRACTOR SHALL PERFORM FINAL CLEANUP INCLUDING REMOVAL OF ALL EQUIPMENT, UNUSED MATERIALS, AND DEBRIS WITHIN THE PROJECT LIMITS, BEFORE THE PROJECT IS CONSIDERED COMPLETE.
4. A FINAL INSPECTION AND A 24-HOUR NOTICE SHALL BE REQUIRED AFTER COMPLETION OF WORK AND FINAL CLEANUP. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE THE FINAL INSPECTION WITH ALL CONCERNED PARTIES (OWNER AND ENGINEER).

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O:\proj\Y2015\15-06057-005\CAD\Dwg\GENERAL.dwg | 2/3/2020 3:57 PM | Eric Marshall

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ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

STILLAGUAMISH stulǝgʷaʼbš VILLAGE

HERRERA

IVAN B. MOSTRENKO — STATE OF WASHINGTON — 36069 — REGISTERED PROFESSIONAL ENGINEER

DESIGNED: I. MOSTRENKO	DRAWN: R. MARSHALL	DATE: FEBRUARY 2020	
DESIGNED: C. AVOLIO	DRAWN: -	PROJECT NO: 15-06057-005	
DESIGNED: -	CHECKED: M. EWBANK	DRAWING NO: G2.01	
SCALE: AS NOTED	APPROVED: I. MOSTRENKO	SHEET NO: 4 OF 61	

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

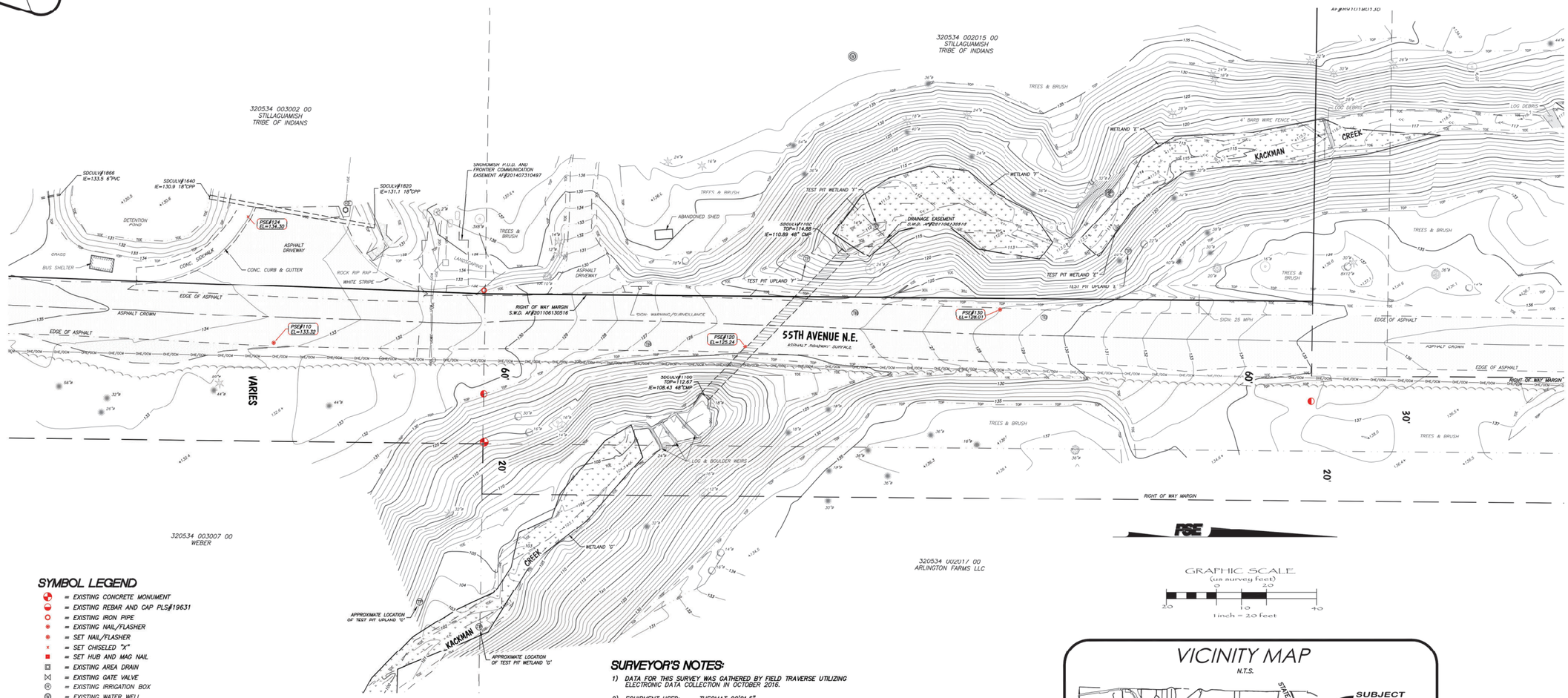
GENERAL NOTES

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PACIFIC SURVEY & ENGINEERING INC
909 SQUALICUM WAY #111, BELLINGHAM, WA 98225 PHONE:360.671.7387 FAX:360.671.4685
www.psesurvey.com EMAIL: info@psesurvey.com

TOPOGRAPHIC SURVEY

SITUATE IN A PORTION OF THE NW 1/4 AND THE SW 1/4 OF SECTION 34
TOWNSHIP 32 NORTH, RANGE 5 EAST, W.M., SNOHOMISH COUNTY, WASHINGTON



GRAPHIC SCALE
(as survey feet)
0 10 20
20 40
1 inch = 20 feet

SYMBOL LEGEND

- = EXISTING CONCRETE MONUMENT
- = EXISTING REBAR AND CAP PLS#19631
- = EXISTING IRON PIPE
- = EXISTING NAIL/FLASHER
- = SET NAIL/FLASHER
- = SET CHISELED "X"
- = SET HUB AND MAG NAIL
- = EXISTING AREA DRAIN
- = EXISTING GATE VALVE
- = EXISTING IRRIGATION BOX
- = EXISTING WATER WELL
- = EXISTING FIRE HYDRANT
- = EXISTING HOSE BIB
- = SEPTIC ALARM/SHUTOFF
- = EXISTING SIGN
- = EXISTING MAILBOX
- = EXISTING TEST BORE
- = EXISTING STREET LIGHT POLE
- = EXISTING POWER POLE
- = EXISTING POWER POLE W/DROP
- = EXISTING YARD LIGHT
- = EXISTING GROUND GUY
- = EXISTING ELECTRIC HANDHOLD
- = EXISTING PINE/SPRUCE TREE
- = EXISTING FIR TREE
- = EXISTING LANDSCAPE TREE/UNKNOWN SPECIES TREE
- = EXISTING CEDAR TREE
- = EXISTING ALDER TREE
- = EXISTING MAPLE TREE
- = EXISTING HEMLOCK TREE
- = EXISTING BUSH
- = EXISTING STUMP
- 15"ø = DIAMETER OF EXISTING TREE
- +123.4 = SPOT ELEVATION ON EXISTING GROUND

LINE LEGEND

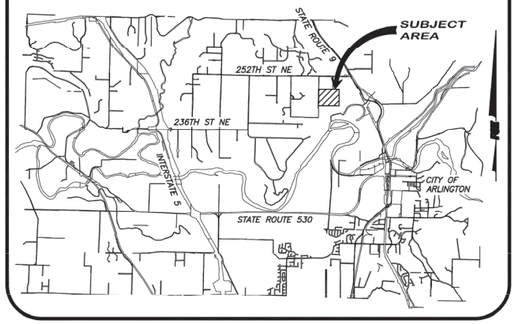
- = EXISTING ROADWAY CENTERLINE
- = EXISTING EDGE OF ASPHALT
- = EXISTING EDGE OF CONCRETE
- = EXISTING EDGE OF GRAVEL ROAD
- = EXISTING CURB
- = EXISTING SIDEWALK
- = EXISTING WHITE STRIPE
- = EXISTING STORM CULVERT
- W = EXISTING WATER LINE
- OHE/OCM = EXISTING OVERHEAD ELECTRIC & COMMUNICATION LINES
- UGE = EXISTING UNDERGROUND POWER
- UCM = EXISTING UNDERGROUND COMMUNICATIONS LINE
- TOP = EXISTING TOP OF SLOPE LINE
- TOE = EXISTING TOE OF SLOPE LINE
- 118 = EXISTING GRADE INDEX CONTOUR
- = EXISTING GRADE INTERVAL CONTOUR
- >> = EXISTING FLOW LINE
- = EXISTING EDGE OF TREES & BRUSH
- = EXISTING EDGE OF LANDSCAPED AREA
- X = EXISTING CHAINLINK FENCE
- = EXISTING BARBED WIRE FENCE
- = EXISTING WOOD FENCE
- = EXISTING VINYL & ELECTRIC FENCE
- = ORDINARY HIGH WATER FLAGGING
- = WETLAND FLAGGING

SURVEYOR'S NOTES:

1) DATA FOR THIS SURVEY WAS GATHERED BY FIELD TRAVERSE UTILIZING ELECTRONIC DATA COLLECTION IN OCTOBER 2016.
2) EQUIPMENT USED: THEOMAT 00'01.5" EDM: ± 2 PM, ± 3 MM
3) HORIZONTAL DATUM: NAD 83/91 WASHINGTON STATE PLANE NORTH ZONE
   BASIS OF BEARINGS: REFERENCE C1.0 OF DESIGN DRAWINGS DATED JANUARY 24, 2014, "THE STILLAGUAMISH COMMUNITY CENTER" BY WOMER & ASSOCIATES
4) VERTICAL DATUM: NAVD 88
   PRIMARY BENCHMARK: SNOHOMISH COUNTY MON. I.D. 1214 AS PUBLISHED IN WSDOT TRANSPORTATION SURVEY INFORMATION SYSTEM, AND PER PLANS PREPARED BY WOMER AND ASSOCIATES FOR THE STILLAGUAMISH TRIBE DATED JAN. 24, 2014. ELEV= 144.77' (NAVD 88) = 141.06' (NGVD 29)
   PROJECT BENCHMARKS: AS SHOWN HEREON
   TO CONVERT TO MSL (NGVD 29), SUBTRACT 3.707' FROM ELEVATIONS DEPICTED ON MAP.
5) CONTOUR INTERVALS ARE ONE-FOOT AND ARE COMPUTER GENERATED FROM GROUND FIELD TOPOGRAPHY GATHERED FOR THIS SURVEY UTILIZING ELECTRONIC DATA COLLECTION.
6) PACIFIC SURVEYING AND ENGINEERING INC., ASSUMES NO LIABILITY FOR ANY SUBSURFACE CONDITIONS OR FEATURES THAT MAY EXIST THAT ARE UNDETECTABLE AND/OR NOT VISIBLE. NO UNDERGROUND UTILITIES WERE LOCATED FOR THIS SURVEY.
7) THIS TOPOGRAPHY MAP WAS COMPLETED WITHOUT THE BENEFIT OF A TITLE REPORT AND PACIFIC SURVEYING AND ENGINEERING SERVICES, INC. IS NOT RESPONSIBLE FOR ANY EASEMENTS, COVENANTS, AND RESTRICTIONS NOT SHOWN HEREON.
8) ALL UNDERGROUND UTILITIES SHOWN ARE PER PAINTED LOCATES FURNISHED BY APPLIED PROFESSIONAL SERVICES (APS) IN OCTOBER 2016.
9) 55TH AVENUE NE RIGHT OF WAY DETERMINED FROM REVIEW OF DEEDS AND RECORD SURVEYS IN THE VICINITY.
10) WETLAND DELINEATION BY HERRERA, INC. AND SURVEYED BY PACIFIC SURVEYING AND ENGINEERING IN AUGUST 2017 (REFERENCE REPORT FOR ADDITIONAL INFORMATION).

VICINITY MAP

N.T.S.



CALL BEFORE YOU DIG 1-800-424-5555

FIELD BOOKS	TBM. NO.	LOCATION	ELEV.
DESIGN: 649 SERIES			
STAKING:			
ASBUILT:	NAVD 88		
SURVEY REFERENCE	(SEE SURVEY NOTES)	VERTICAL DATUM	

DATA	DRAWN BY	CHECKED BY	SCALE
BASE	JAM	ASM	HORIZ: 1" = 20'
DESIGN			VERT: N/A
XREF:			
DWG # 2016087_avX_TB_12 10.dwg			
PLAN CHECK			

REV	DATE	DESCRIPTION	BY
1	12.19.19	REVISED PER COUNTY COMMENTS	AM
REVISIONS			

No.		DATE
1	TOPO BASE MAP	11.11.16
2	SUPPLEMENTAL TOPO	9.1.17
3	FINAL BASE MAP	11.7.18
ISSUE		

HERRERA ENVIRONMENTAL CONSULTANTS
2200 SIXTH AVENUE, SUITE 1100
SEATTLE, WA 98121

TOPOGRAPHIC SURVEY
EXISTING CONDITIONS
KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT
SNOHOMISH COUNTY PFN #19-112866 D5

JOB #: 2016087 G3.01

12-19-2019
ADAM SCOTT MORROW
STATE OF WASHINGTON
REGISTERED PROFESSIONAL LAND SURVEYOR
2019.12.19 11:00:38 -08'00'



W20-1

SIGN (A)



W20-4

SIGN (B)



W20-7B

SIGN (C)



W20-7A

SIGN (D)



R1-2

SIGN (E)



G20-2

SIGN (F)



R1-2ap

SIGN (G)



W1-4(R)

SIGN (H)

MINIMUM LANE CLOSURE TAPER LENGTH = L (feet)										
LANE WIDTH (feet)	Posted Speed (mph)									
	25	30	35	40	45	50	55	60	65	70
10	105	150	205	270	450	500	550	-	-	-
11	115	165	225	295	495	550	605	660	-	-
12	125	180	245	320	540	600	660	720	780	840

MINIMUM SHOULDER TAPER LENGTH = L/3 (feet)										
SHOULDER WIDTH (feet)	Posted Speed (mph)									
	25	30	35	40	45	50	55	60	65	70
8'	40	40	60	90	120	130	150	160	170	190
10'	40	60	90	90	150	170	190	200	220	240
USE A MINIMUM 3 DEVICES TAPER FOR SHOULDER LESS THEN 8'.										

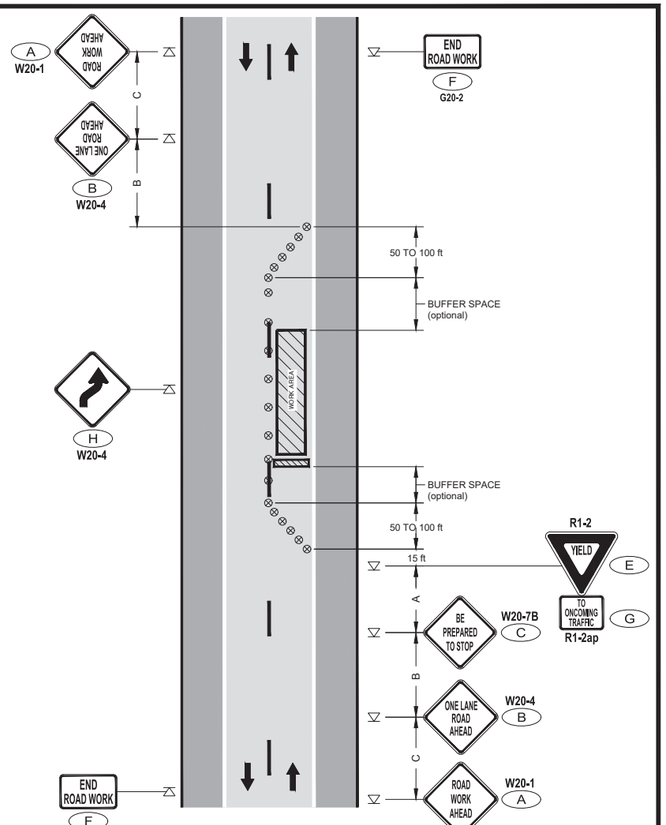
BUFFER DATA										
LONGITUDINAL BUFFER SPACE = B										
	25	30	35	40	45	50	55	60	65	70
LENGTH (feet)	155	200	250	305	360	425	495	570	645	730
BUFFER VEHICLE ROLL AHEAD DISTANCE = R										
TRANSPORTABLE ATTENUATOR MINIMUM HOST VEHICLE WEIGHT 15,000 LBS. THE MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATION.										30 FEET MIN. TO 100 FEET MAX.

SIGN SPACING = X (1)		
FREEWAYS & EXPRESSWAYS	55 / 70 MPH	1500'
RURAL HIGHWAYS	60 / 65 MPH	800'
RURAL ROADS	45 / 55 MPH	500'
RURAL ROADS & URBAN ARTERIALS	35 / 40 MPH	350'
RURAL ROADS & URBAN ARTERIALS RESIDENTIAL & BUSINESS DISTRICTS	25 / 30 MPH	200' (2)
URBAN STREETS	25 MPH OR LESS	100' (2)
(1) ALL SPACING MAY BE ADJUSTED TO ACCOMMODATE INTERCHANGE RAMPS, AT-GRADE INTERSECTIONS AND DRIVEWAYS. (2) THIS SPACING MAY BE REDUCED IN URBAN AREAS TO FIT ROADWAY CONDITIONS.		

CHANNELIZATION DEVICE SPACING (feet)		
MPH	TAPER	TANGENT
50/70	40	80
35/45	30	60
25/30	20	40

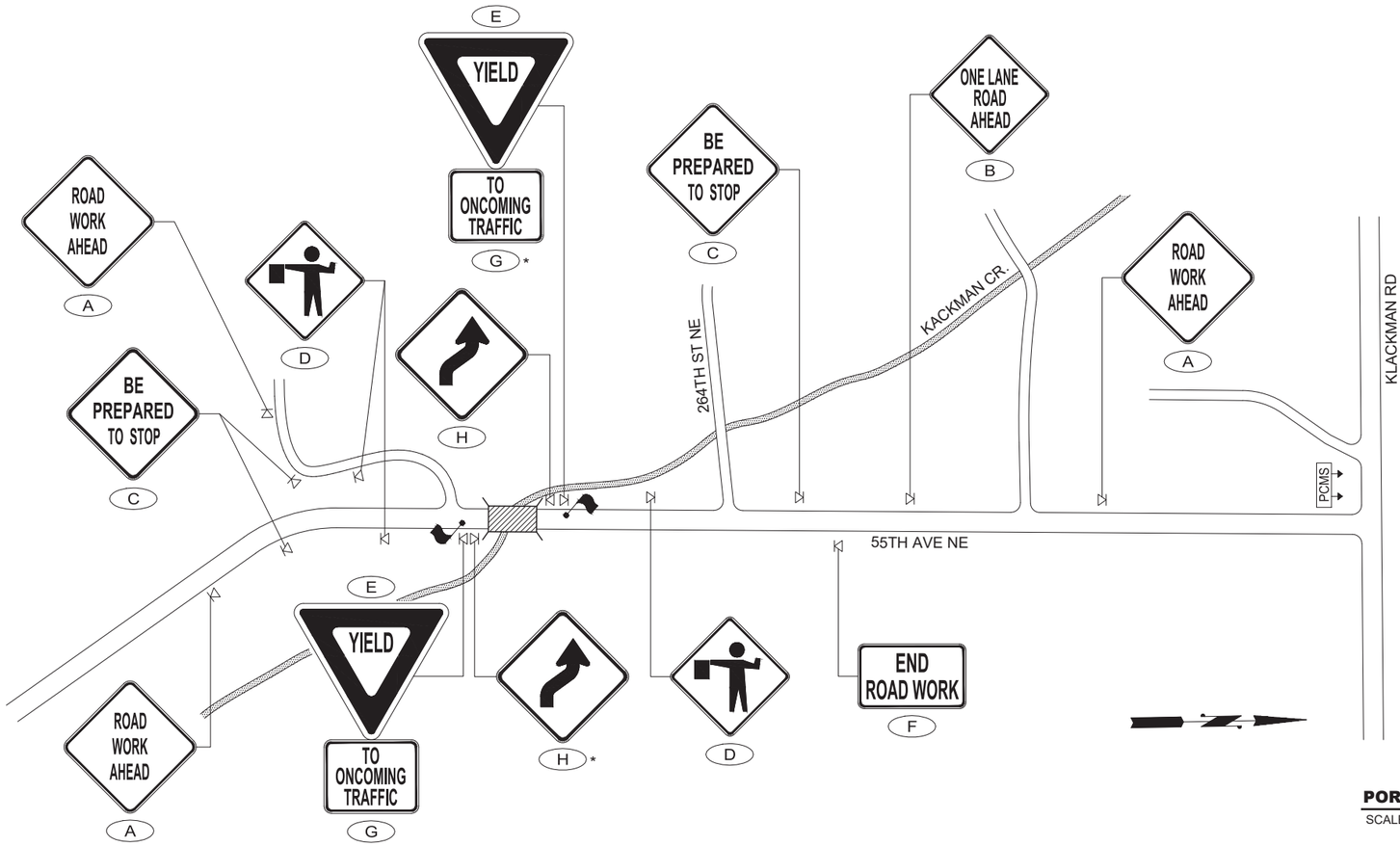
NOTES:

1. SEE SPECIAL PROVISIONS FOR WORK HOUR RESTRICTIONS.
2. EXTEND DEVICE TAPER AT L/3 ACROSS SHOULDER.
3. DEVICES SHALL NOT ENCROACH INTO THE ADJACENT LANE.
4. USE TRANSVERSE DEVICES IN CLOSED LANE EVERY 1000' (FT) (RECOMMENDED).
5. DEVICE SPACING FOR THE DOWNSTREAM TAPER SHALL BE 20' (FT).
6. ALL SIGNS ARE BLACK ON ORANGE.
7. IDENTICAL SIGNAGE CONFIGURATION FOR TRAFFIC IN BOTH DIRECTIONS



LANE CLOSURE ON A TWO LANE ROAD WITH LOW TRAFFIC VOLUMES (T19-11)

* REVERSIBLE AS REQUIRED FOR STAGING



LEGEND:

- FLAGGER
- TEMPORARY SIGN LOCATION
- TRAFFIC SAFETY DRUM
- SEQUENTIAL ARROW SIGN
- TRANSPORTABLE ATTENUATOR (WHEN WARRANTED)
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN

OPERATIONS NOTES:

1. DURING HOURS OF CONSTRUCTION, FLAGGERS MAY CONTROL VEHICULAR TRAFFIC THROUGH WORK ZONE.
2. BRIDGE CONSTRUCTION WILL OCCUR IN TWO STAGES WITH ONE LANE OF TRAFFIC OPEN AND MAINTAINED AT ALL TIMES.

PCMS																			
PANEL 1									PANEL 2										
R	O	A	D	W	O	R	K		E	X	P	E	C	T					
	B	E	G	I	N	S			D	E	L	A	Y	S					
M	M	/	D	D	/	Y	Y												
2.0 SEC									2.0 SEC										

GENERAL NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) SECTION 6 AND THE WSDOT STANDARD SPECIFICATIONS.
2. ALL SIGNS SHALL BE PER WSDOT SIGN FABRICATION MANUAL, UNLESS OTHERWISE SPECIFIED. DIAMOND SHAPED SIGNS SHALL BE 36 IN x 36 IN.
3. REMOVE CONFLICTING EXISTING PAVEMENT MARKINGS AND SECURELY COVER CONFLICTING EXISTING SIGNS, AS NECESSARY.
4. A MINIMUM OF 5 CHANNELIZATION DEVICES SHALL BE USED ON TAPERS.
5. CONTRACTOR SHALL INSTALL AND/OR REMOVE ALL NECESSARY TEMPORARY TRAFFIC CONTROL SIGNS, AS NOTED ON THESE PLANS.
6. NOTIFY THE FOLLOWING ENTITIES 14 DAYS PRIOR TO ANY TEMPORARY CLOSURE, DETOUR, OR TRAFFIC CONTROL CHANGES:
   - STILLAGUAMISH TRIBE OF INDIANS
   - STILLAGUAMISH POLICE DEPT.
   - SNOHOMISH COUNTY PUBLIC WORKS
   - SNOHOMISH COUNTY SHERIFF DEPT.
   - NORTH COUNTY REGIONAL FIRE

PORTABLE CHANGEABLE MESSAGE SIGN DETAIL (1)

SCALE: NTS

TRANTECH Engineering LLC
1221 FRASER ST; SUITE E-3 I BELLINGHAM, WA 98229

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stulǝgʷaʼbš
VILLAGE

HERRERA

THOMAS M. WELLER — STATE OF WASHINGTON — 36669 — REGISTERED PROFESSIONAL ENGINEER
2/3/2020

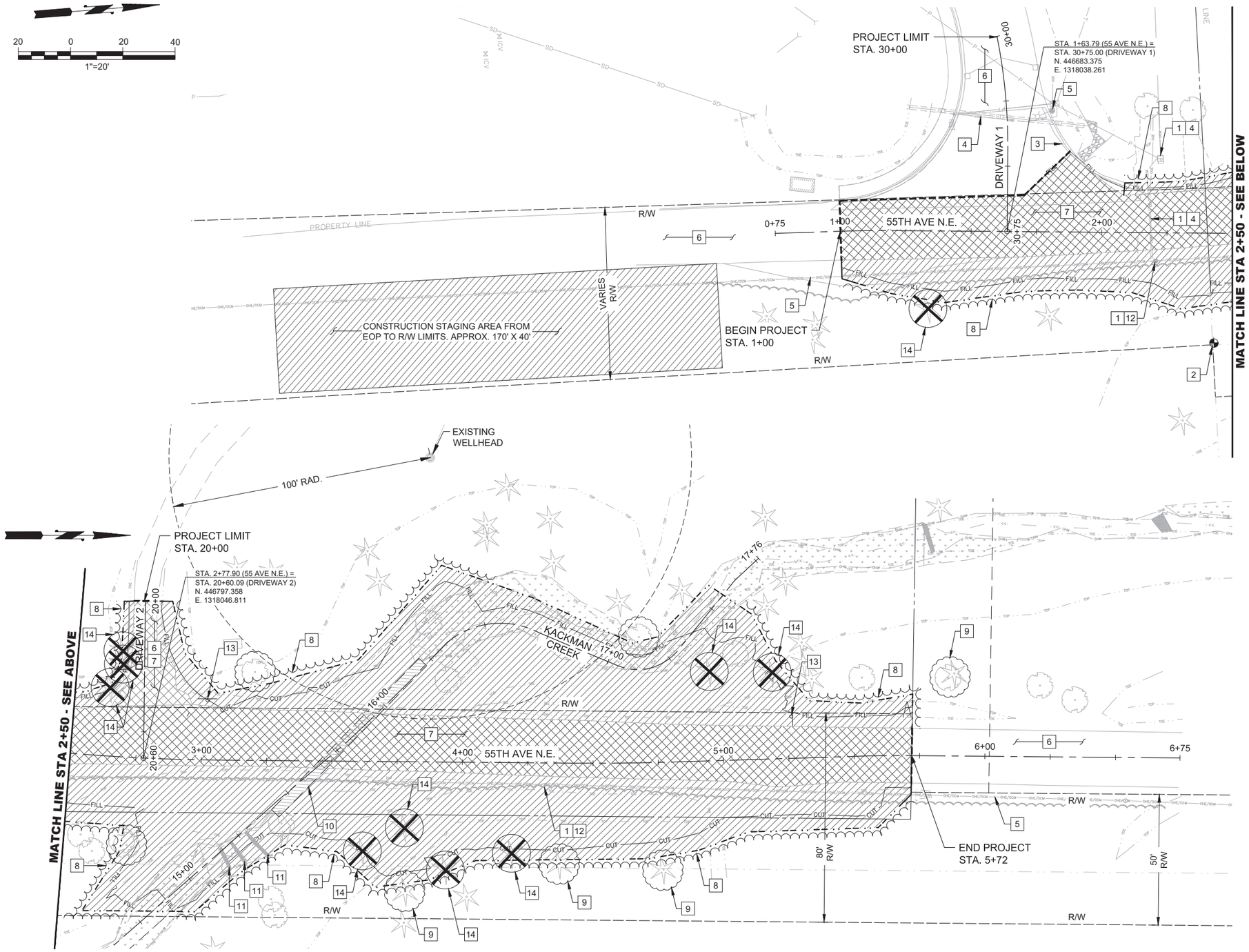
DESIGNED: T. WELLER	DRAWN: M. SCHAEFER
DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: N/A	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

TEMPORARY TRAFFIC CONTROL PLAN

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	C1.01
SHEET NO: / OF	6 / 61

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GENERAL NOTES:

1. SEE DRAWING G1.01 FOR ABBREVIATIONS AND LEGEND.

XX CONSTRUCTION NOTES:

1. CONTRACTOR SHALL COORDINATE WITH UTILITY PROVIDERS AS NECESSARY FOR WORK NEAR DRY UTILITIES.
2. PRESERVE & PROTECT EXIST SURVEY MONUMENT.
3. PRESERVE & PROTECT EXIST CHANNELIZATION MARKINGS.
4. PRESERVE & PROTECT EXIST BURIED UTILITY.
5. PRESERVE & PROTECT EXIST OVERHEAD UTILITY.
6. MAINTAIN ACCESS DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN.
7. SAWCUT, REMOVE & DISPOSE OF ASPHALT PAVEMENT WITHIN THE LIMITS SHOWN.
8. ESTABLISH CLEARING LIMITS, PLACING STAKES AT ALL ANGLE POINTS AND AT INTERMEDIATE POINTS NOT MORE THAN 50 FEET APART. THE CLEARING AND GRUBBING LIMITS SHALL BE 5 FEET BEYOND THE TOE OF A FILL AND 10 FEET BEYOND THE TOP OF A CUT UNLESS OTHERWISE SHOWN IN THE PLANS.
9. INSTALL TREE PROTECTION PER DETAIL "A" THIS SHEET.
10. REMOVE & DISPOSE OF EXIST 48" CMP CULVERT.
11. REMOVE & DISPOSE OF EXIST LOG AND ROCK WEIRS.
12. UTILITY REMOVED & RELOCATED BY OTHERS.
13. REMOVE EXIST SIGN & POST.
14. REMOVE AND SALVAGE EXISTING TREE FOR INCORPORATION INTO THE LOG STRUCTURES AS SHOWN ON DRAWINGS ST3.02 AND ST3.03 AND AS DESCRIBED IN THE SPECIAL PROVISIONS.
15. PROTECT WATER DISTRIBUTION MAIN IN-PLACE WITH STEEL PLATES OR APPROVED EQUAL WHERE ANY VEHICLE IS EXPECTED.

C & G STAKING PNTS.	
STATION	OFFSET
2+08.09	18.94' LT
2+29.78	19.62' LT
2+54.35	24.24' LT
2+63.89	28.01' LT
2+67.15	37.52' LT
2+66.80	59.48' LT
2+87.05	60.36' LT
2+92.65	40.83' LT
3+06.21	25.60' LT
3+26.75	29.66' LT
3+59.81	38.81' LT
3+91.34	75.27' LT
4+26.54	63.11' LT
4+65.63	45.94' LT
4+75.89	48.03' LT
4+96.19	67.33' LT
5+12.42	55.65' LT
5+21.02	37.59' LT
5+33.44	21.91' LT
5+53.37	20.29' LT
5+72.17	23.54' LT
5+72.17	10.53' LT

C & G STAKING PNTS.	
STATION	OFFSET
1+00.00	18.20' RT
1+19.95	24.15' RT
1+40.09	27.37' RT
1+70.93	22.82' RT
1+90.92	22.16' RT
2+11.63	22.92' RT
2+30.68	29.01' RT
2+50.46	26.12' RT
2+71.85	26.19' RT
2+70.71	36.12' RT
2+58.78	59.65' RT
2+98.59	58.03' RT
3+15.50	42.77' RT
3+32.46	32.17' RT
3+52.31	34.66' RT
3+67.13	48.09' RT
3+86.92	45.22' RT
4+05.40	37.58' RT
4+70.13	36.76' RT
4+89.52	34.02' RT
5+08.47	27.61' RT
5+58.60	27.51' RT
5+71.89	14.88' RT

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HERRERA

THOMAS M. WELLER STATE OF WASHINGTON 36669 REGISTERED PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: T. WELLER	DRAWN: M. SCHAEFER
DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: AS SHOWN	APPROVED: C. AVOLIO

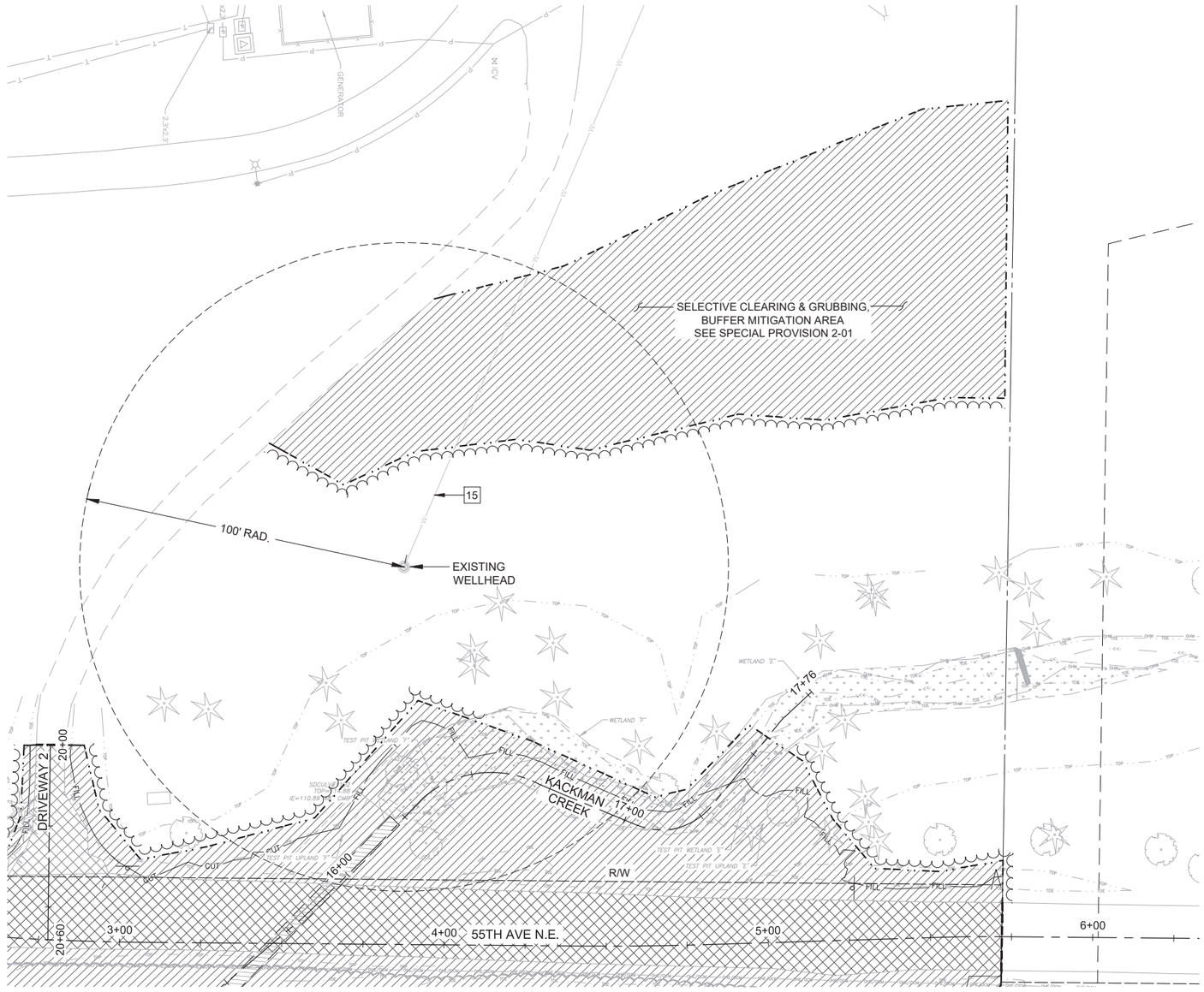
KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

SITE PREPARATION PLAN 1

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	C2.01
SHEET NO:	7 OF 61

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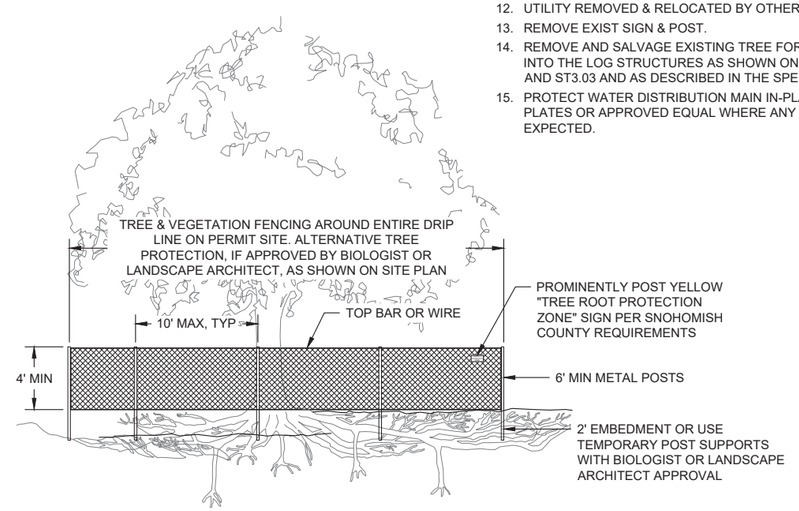
C & G STAKING PNTS.	
NORTHING	EASTING
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447067.0237	1317790.6344
447002.0810	1317816.8277
446956.4371	1317839.0306
446916.4948	1317849.2030

GENERAL NOTES:

1. SEE DRAWING G1.01 FOR ABBREVIATIONS AND LEGEND.

XX CONSTRUCTION NOTES:

1. CONTRACTOR SHALL COORDINATE WITH UTILITY PROVIDERS AS NECESSARY FOR WORK NEAR DRY UTILITIES.
2. PRESERVE & PROTECT EXIST SURVEY MONUMENT.
3. PRESERVE & PROTECT EXIST CHANNELIZATION MARKINGS.
4. PRESERVE & PROTECT EXIST BURIED UTILITY.
5. PRESERVE & PROTECT EXIST OVERHEAD UTILITY.
6. MAINTAIN ACCESS DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN.
7. SAWCUT, REMOVE & DISPOSE OF ASPHALT PAVEMENT WITHIN THE LIMITS SHOWN.
8. ESTABLISH CLEARING LIMITS, PLACING STAKES AT ALL ANGLE POINTS AND AT INTERMEDIATE POINTS NOT MORE THAN 50 FEET APART. THE CLEARING AND GRUBBING LIMITS SHALL BE 5 FEET BEYOND THE TOE OF A FILL AND 10 FEET BEYOND THE TOP OF A CUT UNLESS OTHERWISE SHOWN IN THE PLANS.
9. INSTALL TREE PROTECTION PER DETAIL "A" THIS SHEET.
10. REMOVE & DISPOSE OF EXIST 48" CMP CULVERT.
11. REMOVE & DISPOSE OF EXIST LOG AND ROCK WEIRS.
12. UTILITY REMOVED & RELOCATED BY OTHERS.
13. REMOVE EXIST SIGN & POST.
14. REMOVE AND SALVAGE EXISTING TREE FOR INCORPORATION INTO THE LOG STRUCTURES AS SHOWN ON DRAWINGS ST3.02 AND ST3.03 AND AS DESCRIBED IN THE SPECIAL PROVISIONS.
15. PROTECT WATER DISTRIBUTION MAIN IN-PLACE WITH STEEL PLATES OR APPROVED EQUAL WHERE ANY VEHICLE IS EXPECTED.



TREE PROTECTION FENCING AND SIGN NOTES:

1. CHAIN LINK, WIRE MESH, OR SIMILAR OPEN RIGID MATERIAL (NO PLYWOOD).
2. MUST BE INSTALLED PRIOR TO DEMOLITION OR GROUND DISTURBANCE.
3. KEPT IN PLACE FOR THE DURATION OF CONSTRUCTION.
4. NO SOIL DISTURBANCE OR ACTIVITY ALLOWED WITHIN FENCED AREA: MATERIAL STORAGE/STOCKPILING, PARKING, EXCAVATION, DUMPING, OR WASHING.
5. MODIFICATIONS OF THESE REQUIREMENTS BY APPROVAL OF BIOLOGIST OR LANDSCAPE ARCHITECT ONLY.
6. IF ROOTS GREATER THAN 2-INCH FOUND OUTSIDE OF FENCING, PROTECT BY HAND EXCAVATION AND, IF NECESSARY, CUT CLEANLY AND KEEP MOIST.
7. USE 3 INCHES OR DEEPER WOOD CHIP MULCH OUTSIDE FENCED AREAS TO PROTECT FEEDER ROOTS.

VEGETATION PROTECTION NOTES:

1. ORANGE MESH OR SIMILAR OPEN MATERIAL.
2. MINIMIZE CONSTRUCTION ZONE.
3. PROTECT VEGETATION OUTSIDE CONSTRUCTION ZONE WITH FENCING AS SHOWN.
4. USE 3 INCHES OR DEEPER WOOD CHIP MULCH OUTSIDE FENCED AREA TO PROTECT FEEDER ROOTS.

DETAIL - TREE PROTECTION FENCING (A / -)

SCALE: NTS

TRANTECH Engineering LLC
1221 FRASER ST; SUITE E-3 I BELLINGHAM, WA 98229

811 Know what's **below.** **Call** before you dig.

ORIGINATED BY: / DATE:
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VERIFIED BY: / DATE:
Z:\2017\2017019 - Stillguamish Kackman Creek Culverts\000 CAD\010 Drawing\B-Civil Sheet\2017019_SP.DWG | 1/31/2020 8:06 AM | Michael Schaefer

100% DESIGN - BID SET

No.	REVISION	BY	APP'D	DATE

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

STILLAGUAMISH stuləgʷaʔbš VILLAGE

HERRERA

THOMAS M. WELLER STATE OF WASHINGTON 36669 REGISTERED PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: T. WELLER	DRAWN: M. SCHAEFER
DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

SITE PREPARATION PLAN 2

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	C2.02
SHEET NO:	8 OF 61

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EROSION CONTROL NOTES:

THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.

THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.

PUBLIC AND PRIVATE DRAINAGE WAYS SHALL BE PROTECTED FROM POLLUTION. NO MATERIAL IS TO BE DISCHARGED OR DEPOSITED IN STORMWATER SYSTEMS THAT MAY RESULT IN VIOLATION OF STATE OR FEDERAL WATER QUALITY STANDARDS.

DURING ANY DITCH, CREEK, OR DRAINAGE WORK, RUNOFF SHALL BE DIVERTED AROUND THE WORK AREA WITH A PUMP, DIVERSIONS, BARRIERS, OR OTHER METHODS.

CONSTRUCTION STOMWATER POLLUTION PREVENTION PLAN (SWPPP) ELEMENTS:

ELEMENT 1 - PRESERVE VEGETATION/MARK CLEARING LIMITS

a. BEFORE BEGINNING LAND-DISTURBING ACTIVITIES, INCLUDING CLEARING AND GRADING, CLEARLY MARK ALL CLEARING LIMITS, SENSITIVE AREAS AND THEIR BUFFERS, AND TREES THAT ARE TO BE PRESERVED WITHIN THE CONSTRUCTION AREA.

b. RETAIN THE DUFF LAYER, NATIVE TOPSOIL, AND NATURAL VEGETATION IN AN UNDISTURBED STATE TO THE MAXIMUM DEGREE PRACTICABLE.

ELEMENT 2 - ESTABLISH CONSTRUCTION ACCESS

a. LIMIT CONSTRUCTION VEHICLE ACCESS AND EXIT TO ONE ROUTE, IF POSSIBLE.

b. STABILIZE ACCESS POINTS WITH A PAD OF QUARRY SPALLS, CRUSHED ROCK, OR OTHER EQUIVALENT BMPS, TO MINIMIZE TRACKING SEDIMENT ONTO ROADS.

c. LOCATE WHEEL WASH OR TIRE BATHS ON SITE, IF THE STABILIZED CONSTRUCTION ENTRANCE IS NOT EFFECTIVE IN PREVENTING TRACKING SEDIMENT ONTO ROADS.

d. IF SEDIMENT IS TRACKED OFF SITE, CLEAN THE AFFECTED ROADWAY THOROUGHLY AT THE END OF EACH DAY, OR MORE FREQUENTLY AS NECESSARY (FOR EXAMPLE, DURING WET WEATHER). REMOVE SEDIMENT FROM ROADS BY SHOVELING, SWEEPING, OR PICKUP AND TRANSPORT OF THE SEDIMENT TO A CONTROLLED SEDIMENT DISPOSAL AREA.

e. CONDUCT STREET WASHING ONLY AFTER SEDIMENT REMOVAL IN ACCORDANCE WITH SPECIAL CONDITION S9.D.2.D. CONTROL STREET WASH WASTEWATER BY PUMPING BACK ON SITE OR OTHERWISE PREVENTING IT FROM DISCHARGING INTO SYSTEMS TRIBUTARY TO WATERS OF THE STATE.

ELEMENT 3 - CONTROL FLOW RATES

a. PROTECT PROPERTIES AND WATERWAYS DOWNSTREAM OF DEVELOPMENT SITES FROM EROSION AND THE ASSOCIATED DISCHARGE OF TURBID WATERS DUE TO INCREASES IN THE VELOCITY AND PEAK VOLUMETRIC FLOW RATE OF STORMWATER RUNOFF FROM THE PROJECT SITE, AS REQUIRED BY LOCAL PLAN APPROVAL AUTHORITY.

b. WHERE NECESSARY TO COMPLY WITH SPECIAL CONDITION S9.D.3.A, CONSTRUCT STORMWATER RETENTION OR DETENTION FACILITIES AS ONE OF THE FIRST STEPS IN GRADING. ASSURE THAT DETENTION FACILITIES FUNCTION PROPERLY BEFORE CONSTRUCTING SITE IMPROVEMENTS (FOR EXAMPLE, IMPERVIOUS SURFACES).

c. IF PERMANENT INFILTRATION PONDS ARE USED FOR FLOW CONTROL DURING CONSTRUCTION, PROTECT THESE FACILITIES FROM SILTATION DURING THE CONSTRUCTION PHASE.

ELEMENT 4 - INSTALL SEDIMENT CONTROLS

THE PERMITTEE MUST DESIGN, INSTALL AND MAINTAIN EFFECTIVE EROSION CONTROLS AND SEDIMENT CONTROLS TO MINIMIZE THE DISCHARGE OF POLLUTANTS. AT A MINIMUM, THE PERMITTEE MUST DESIGN, INSTALL AND MAINTAIN SUCH CONTROLS TO:

a. CONSTRUCT SEDIMENT CONTROL BMPS (SEDIMENT PONDS, TRAPS, FILTERS, INFILTRATION FACILITIES, ETC.) AS ONE OF THE FIRST STEPS IN GRADING. THESE BMPS MUST BE FUNCTIONAL BEFORE OTHER LAND DISTURBING ACTIVITIES TAKE PLACE.

b. MINIMIZE SEDIMENT DISCHARGES FROM THE SITE. THE DESIGN, INSTALLATION, AND MAINTENANCE OF EROSION AND SEDIMENT CONTROLS MUST ADDRESS FACTORS SUCH AS THE AMOUNT, FREQUENCY, INTENSITY AND DURATION OF PRECIPITATION, THE NATURE OF RESULTING STORMWATER RUNOFF, AND SOIL CHARACTERISTICS, INCLUDING THE RANGE OF SOIL PARTICLE SIZES EXPECTED TO BE PRESENT ON THE SITE.

c. DIRECT STORMWATER RUNOFF FROM DISTURBED AREAS THROUGH A SEDIMENT POND OR OTHER APPROPRIATE SEDIMENT REMOVAL BMP BEFORE THE RUNOFF LEAVES A CONSTRUCTION SITE OR BEFORE DISCHARGE TO AN INFILTRATION FACILITY. RUNOFF FROM FULLY STABILIZED AREAS MAY BE DISCHARGED WITHOUT A SEDIMENT REMOVAL BMP BUT MUST MEET THE FLOW CONTROL PERFORMANCE STANDARD OF SPECIAL CONDITION S9.D.3.A.

d. LOCATE BMPS INTENDED TO TRAP SEDIMENT ON SITE IN A MANNER TO AVOID INTERFERENCE WITH THE MOVEMENT OF JUVENILE SALMONIDS ATTEMPTING TO ENTER OFF-CHANNEL AREAS OR DRAINAGES.

e. PROVIDE AND MAINTAIN NATURAL BUFFERS AROUND SURFACE WATERS, DIRECT STORMWATER TO VEGETATED AREAS TO INCREASE SEDIMENT REMOVAL AND MAXIMIZE STORMWATER INFILTRATION, UNLESS INFEASIBLE.

f. WHERE FEASIBLE, DESIGN OUTLET STRUCTURES THAT WITHDRAW IMPOUNDED STORMWATER FROM THE SURFACE TO AVOID DISCHARGING SEDIMENT THAT IS STILL SUSPENDED LOWER IN THE WATER COLUMN.

ELEMENT 5 - STABILIZE SOILS

a. THE PERMITTEE MUST STABILIZE EXPOSED AND UNWORKED SOILS BY APPLICATION OF EFFECTIVE BMPS THAT PREVENT EROSION. APPLICABLE BMPS INCLUDE BUT ARE NOT LIMITED TO: TEMPORARY AND PERMANENT SEEDING, SODDING, MULCHING, PLASTIC COVERING, EROSION CONTROL FABRICS AND MATTING, SOIL APPLICATION OF POLYACRYLAMIDE (PAM), THE EARLY APPLICATION OF GRAVEL BASE ON AREAS TO BE PAVED, AND DUST CONTROL.

b. THE PERMITTEE MUST CONTROL STORMWATER VOLUME AND VELOCITY WITHIN THE SITE TO MINIMIZE SOIL EROSION.

c. THE PERMITTEE MUST CONTROL STORMWATER DISCHARGES, INCLUDING BOTH PEAK FLOW RATES AND TOTAL STORMWATER VOLUME, TO MINIMIZE EROSION AT OUTLETS AND TO MINIMIZE DOWNSTREAM CHANNEL AND STREAM BANK EROSION.

d. DEPENDING ON THE GEOGRAPHIC LOCATION OF THE PROJECT, THE PERMITTEE MUST NOT ALLOW SOILS TO REMAIN EXPOSED AND UNWORKED FOR MORE THAN THE TIME PERIODS SET FORTH BELOW TO PREVENT EROSION:

WEST OF THE CASCADE MOUNTAINS CREST
DURING THE DRY SEASON (MAY 1 - SEPTEMBER 30): 7 DAYS DURING THE WET SEASON (OCTOBER 1 - APRIL 30): 2 DAYS

EAST OF THE CASCADE MOUNTAINS CREST, EXCEPT FOR CENTRAL BASIN* DURING THE DRY SEASON (JULY 1 - SEPTEMBER 30): 10 DAYS
DURING THE WET SEASON (OCTOBER 1 - JUNE 30): 5 DAYS

THE CENTRAL BASIN*, EAST OF THE CASCADE MOUNTAINS CREST DURING THE DRY SEASON (JULY 1 - SEPTEMBER 30): 30 DAYS DURING THE WET SEASON (OCTOBER 1 - JUNE 30): 15 DAYS
NOTE THE CENTRAL BASIN IS DEFINED AS THE PORTIONS OF EASTERN WASHINGTON WITH MEAN ANNUAL PRECIPITATION OF FEWER THAN 12 INCHES.

e. THE PERMITTEE MUST STABILIZE SOILS AT THE END OF THE SHIFT BEFORE A HOLIDAY OR WEEKEND IF NEEDED BASED ON THE WEATHER FORECAST.

f. THE PERMITTEE MUST STABILIZE SOIL STOCKPILES FROM EROSION, PROTECTED WITH SEDIMENT TRAPPING MEASURES, AND WHERE POSSIBLE, BE LOCATED AWAY FROM STORM DRAIN INLETS, WATERWAYS, AND DRAINAGE CHANNELS.

g. THE PERMITTEE MUST MINIMIZE THE AMOUNT OF SOIL EXPOSED DURING CONSTRUCTION ACTIVITY.

h. THE PERMITTEE MUST MINIMIZE THE DISTURBANCE OF STEEP SLOPES.

i. THE PERMITTEE MUST MINIMIZE SOIL COMPACTION AND, UNLESS INFEASIBLE, PRESERVE TOPSOIL.

ELEMENT 6 - PROTECT SLOPES

a. THE PERMITTEE MUST DESIGN AND CONSTRUCT CUT-AND-FILL SLOPES IN A MANNER TO MINIMIZE EROSION. APPLICABLE PRACTICES INCLUDE, BUT ARE NOT LIMITED TO, REDUCING CONTINUOUS LENGTH OF SLOPE WITH TERRACING AND DIVERSIONS, REDUCING SLOPE STEEPNESS, AND ROUGHENING SLOPE SURFACES (FOR EXAMPLE, TRACK WALKING).

b. THE PERMITTEE MUST DIVERT OFF-SITE STORMWATER (RUN-ON) OR GROUNDWATER AWAY FROM SLOPES AND DISTURBED AREAS WITH INTERCEPTOR DIKES, PIPES, AND/OR SWALES. OFF-SITE STORMWATER SHOULD BE MANAGED SEPARATELY FROM STORMWATER GENERATED ON THE SITE.

c. AT THE TOP OF SLOPES, COLLECT DRAINAGE IN PIPE SLOPE DRAINS OR PROTECTED CHANNELS TO PREVENT EROSION.

i. WEST OF THE CASCADE MOUNTAINS CREST: TEMPORARY PIPE SLOPE DRAINS MUST HANDLE THE PEAK 10-MINUTE FLOW RATE FROM A TYPE 1A, 10-YEAR, 24-HOUR FREQUENCY STORM FOR THE DEVELOPED CONDITION. ALTERNATIVELY, THE 10-YEAR, 1-HOUR FLOW RATE PREDICTED BY AN APPROVED CONTINUOUS RUNOFF MODEL, INCREASED BY A FACTOR OF 1.6, MAY BE USED. THE HYDROLOGIC ANALYSIS MUST USE THE EXISTING LAND COVER CONDITION FOR PREDICTING FLOW RATES FROM TRIBUTARY AREAS OUTSIDE THE PROJECT LIMITS. FOR TRIBUTARY AREAS ON THE PROJECT SITE, THE ANALYSIS MUST USE THE TEMPORARY OR PERMANENT PROJECT LAND COVER CONDITION, WHICHEVER WILL PRODUCE THE HIGHEST FLOW RATES. IF USING THE WESTERN WASHINGTON HYDROLOGY MODEL (WWHM) TO PREDICT FLOWS, BARE SOIL AREAS SHOULD BE MODELED AS "LANDSCAPED AREA."

ii. EAST OF THE CASCADE MOUNTAINS CREST: TEMPORARY PIPE SLOPE DRAINS MUST HANDLE THE EXPECTED PEAK FLOW RATE FROM A 6-MONTH, 3-HOUR STORM FOR THE DEVELOPED CONDITION, REFERRED TO AS THE SHORT DURATION STORM.

d. PLACE EXCAVATED MATERIAL ON THE UPHILL SIDE OF TRENCHES, CONSISTENT WITH SAFETY AND SPACE CONSIDERATIONS.

e. PLACE CHECK DAMS AT REGULAR INTERVALS WITHIN CONSTRUCTED CHANNELS THAT ARE CUT DOWN A SLOPE.

ELEMENT 7 - PROTECT DRAIN INLETS

a. PROTECT ALL STORM DRAIN INLETS MADE OPERABLE DURING CONSTRUCTION SO THAT STORMWATER RUNOFF DOES NOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR TREATED TO REMOVE SEDIMENT.

b. CLEAN OR REMOVE AND REPLACE INLET PROTECTION DEVICES WHEN SEDIMENT HAS FILLED ONE-THIRD OF THE AVAILABLE STORAGE (UNLESS A DIFFERENT STANDARD IS SPECIFIED BY THE PRODUCT MANUFACTURER).

ELEMENT 8 - STABILIZE CHANNELS AND OUTLETS

a. DESIGN, CONSTRUCT, AND STABILIZE ALL ON-SITE CONVEYANCE CHANNELS TO PREVENT EROSION FROM THE FOLLOWING EXPECTED PEAK FLOWS:

iii. WEST OF THE CASCADE MOUNTAINS CREST: CHANNELS MUST HANDLE THE PEAK 10-MINUTE FLOW RATE FROM A TYPE 1A, 10-YEAR, 24-HOUR FREQUENCY STORM FOR THE DEVELOPED CONDITION. ALTERNATIVELY, THE 10-YEAR, 1-HOUR FLOW RATE INDICATED BY AN APPROVED CONTINUOUS RUNOFF MODEL, INCREASED BY A FACTOR OF 1.6, MAY BE USED. THE HYDROLOGIC ANALYSIS MUST USE THE EXISTING LAND COVER CONDITION FOR PREDICTING FLOW RATES FROM TRIBUTARY AREAS OUTSIDE THE PROJECT LIMITS. FOR TRIBUTARY AREAS ON THE PROJECT SITE, THE ANALYSIS MUST USE THE TEMPORARY OR PERMANENT PROJECT LAND COVER CONDITION, WHICHEVER WILL PRODUCE THE HIGHEST FLOW RATES. IF USING THE WWHM TO PREDICT FLOWS, BARE SOIL AREAS SHOULD BE MODELED AS "LANDSCAPED AREA."

iV. EAST OF THE CASCADE MOUNTAINS CREST: CHANNELS MUST HANDLE THE EXPECTED PEAK FLOW RATE FROM A 6-MONTH, 3-HOUR STORM FOR THE DEVELOPED CONDITION, REFERRED TO AS THE SHORT DURATION STORM.

b. PROVIDE STABILIZATION, INCLUDING ARMORING MATERIAL, ADEQUATE TO PREVENT EROSION OF OUTLETS, ADJACENT STREAM BANKS, SLOPES, AND DOWNSTREAM REACHES AT THE OUTLETS OF ALL CONVEYANCE SYSTEMS.

ELEMENT 9 - CONTROL POLLUTANTS

DESIGN, INSTALL, IMPLEMENT, AND MAINTAIN EFFECTIVE POLLUTION PREVENTION MEASURES TO MINIMIZE THE DISCHARGE OF POLLUTANTS. THE PERMITTEE MUST:

a. HANDLE AND DISPOSE OF ALL POLLUTANTS, INCLUDING WASTE MATERIALS AND DEMOLITION DEBRIS THAT OCCUR ON SITE IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF STORMWATER.

b. PROVIDE COVER, CONTAINMENT, AND PROTECTION FROM VANDALISM FOR ALL CHEMICALS, LIQUID PRODUCTS, PETROLEUM PRODUCTS, AND OTHER MATERIALS THAT HAVE THE POTENTIAL TO POSE A THREAT TO HUMAN HEALTH OR THE ENVIRONMENT. ON-SITE FUELING TANKS MUST INCLUDE SECONDARY CONTAINMENT. SECONDARY CONTAINMENT MEANS PLACING TANKS OR CONTAINERS WITHIN AN IMPERVIOUS STRUCTURE CAPABLE OF CONTAINING 110% OF THE VOLUME CONTAINED IN THE LARGEST TANK WITHIN THE CONTAINMENT STRUCTURE. DOUBLE- WALLED TANKS DO NOT REQUIRE ADDITIONAL SECONDARY CONTAINMENT.

c. CONDUCT MAINTENANCE, FUELING, AND REPAIR OF HEAVY EQUIPMENT AND VEHICLES USING SPILL PREVENTION AND CONTROL MEASURES. CLEAN CONTAMINATED SURFACES IMMEDIATELY FOLLOWING ANY SPILL INCIDENT.

d. DISCHARGE WHEEL WASH OR TIRE BATH WASTEWATER TO A SEPARATE ON-SITE TREATMENT SYSTEM THAT PREVENTS DISCHARGE TO SURFACE WATER, SUCH AS CLOSED-LOOP RECIRCULATION OR UPLAND LAND APPLICATION, OR TO THE SANITARY SEWER WITH LOCAL SEWER DISTRICT APPROVAL.

e. APPLY FERTILIZERS AND PESTICIDES IN A MANNER AND AT APPLICATION RATES THAT WILL NOT RESULT IN LOSS OF CHEMICAL TO STORMWATER RUNOFF. FOLLOW MANUFACTURERS' LABEL REQUIREMENTS FOR APPLICATION RATES AND PROCEDURES.

f. USE BMPS TO PREVENT CONTAMINATION OF STORMWATER RUNOFF BY PH-MODIFYING SOURCES. THE SOURCES FOR THIS CONTAMINATION INCLUDE, BUT ARE NOT LIMITED TO: BULK CEMENT, CEMENT KILN DUST, FLY ASH, NEW CONCRETE WASHING AND CURING WATERS, RECYCLED CONCRETE STOCKPILES, WASTE STREAMS GENERATED FROM CONCRETE GRINDING AND SAWING, EXPOSED AGGREGATE PROCESSES, DEWATERING CONCRETE VAULTS, CONCRETE PUMPING, AND MIXER WASHOUT WATERS. (ALSO REFER TO THE DEFINITION FOR "CONCRETE WASTEWATER" IN APPENDIX A--DEFINITIONS.)

g. ADJUST THE PH OF STORMWATER OR AUTHORIZED NON-STORMWATER IF NECESSARY TO PREVENT AN EXCEEDANCE OF GROUNDWATER AND/OR SURFACE WATER QUALITY STANDARDS.

h. ASSURE THAT WASHOUT OF CONCRETE TRUCKS IS PERFORMED OFF-SITE OR IN DESIGNATED CONCRETE WASHOUT AREAS ONLY. DO NOT WASH OUT CONCRETE TRUCK DRUMS OR CONCRETE HANDLING EQUIPMENT ONTO THE GROUND, OR INTO STORM DRAINS, OPEN DITCHES, STREETS, OR STREAMS. WASHOUT OF CONCRETE HANDLING EQUIPMENT MAY BE DISPOSED OF IN A DESIGNATED CONCRETE WASHOUT AREA OR IN A FORMED AREA AWAITING CONCRETE WHERE IT WILL NOT CONTAMINATE SURFACE OR GROUNDWATER. DO NOT DUMP EXCESS CONCRETE ON SITE, EXCEPT IN DESIGNATED CONCRETE WASHOUT AREAS. CONCRETE SPILLAGE OR CONCRETE DISCHARGE DIRECTLY TO GROUNDWATER OR SURFACE WATERS OF THE STATE IS PROHIBITED. DO NOT WASH OUT TO FORMED AREAS AWAITING LID FACILITIES.

i. OBTAIN WRITTEN APPROVAL FROM ECOLOGY BEFORE USING ANY CHEMICAL TREATMENT, EXCEPT FOR CO2 OR DRY ICE USED TO ADJUST pH.

j. UNCONTAMINATED WATER FROM WATER-ONLY BASED SHAFT DRILLING FOR CONSTRUCTION OF BUILDING, ROAD, AND BRIDGE FOUNDATIONS MAY BE INFILTRATED PROVIDED THE WASTEWATER IS MANAGED IN A WAY THAT PROHIBITS DISCHARGE TO SURFACE WATERS. PRIOR TO INFILTRATION, WATER FROM WATER-ONLY BASED SHAFT DRILLING THAT COMES INTO CONTACT WITH CURING CONCRETE MUST BE NEUTRALIZED UNTIL pH IS IN THE RANGE OF 6.5 TO 8.5 (SU).

ELEMENT 10 - CONTROL DEWATERING

a. PERMITTEES MUST DISCHARGE FOUNDATION, VAULT, AND TRENCH DEWATERING WATER, WHICH HAVE CHARACTERISTICS SIMILAR TO STORMWATER RUNOFF AT THE SITE, INTO A CONTROLLED CONVEYANCE SYSTEM BEFORE DISCHARGE TO A SEDIMENT TRAP OR SEDIMENT POND.
b. PERMITTEES MAY DISCHARGE CLEAN, NON-TURBID DEWATERING WATER, SUCH AS WELL- POINT GROUNDWATER, TO SYSTEMS TRIBUTARY TO, OR DIRECTLY INTO SURFACE WATERS OF THE STATE, AS SPECIFIED IN SPECIAL CONDITION S9.D.8, PROVIDED THE DEWATERING FLOW DOES NOT CAUSE EROSION OR FLOODING OF RECEIVING WATERS. DO NOT ROUTE CLEAN DEWATERING WATER THROUGH STORMWATER SEDIMENT PONDS. NOTE THAT "SURFACE WATERS OF THE STATE" MAY EXIST ON A CONSTRUCTION SITE AS WELL AS OFF SITE; FOR EXAMPLE, A CREEK RUNNING THROUGH A SITE.
c. OTHER DEWATERING TREATMENT OR DISPOSAL OPTIONS MAY INCLUDE:
i. INFILTRATION
ii. TRANSPORT OFF SITE IN A VEHICLE, SUCH AS A VACUUM FLUSH TRUCK, FOR LEGAL DISPOSAL IN A MANNER THAT DOES NOT POLLUTE STATE WATERS.
iii. ECOLOGY-APPROVED ON-SITE CHEMICAL TREATMENT OR OTHER SUITABLE TREATMENT TECHNOLOGIES (SEE S9.D.9.I. REGARDING CHEMICAL TREATMENT WRITTEN APPROVAL).
iv. SANITARY OR COMBINED SEWER DISCHARGE WITH LOCAL SEWER DISTRICT APPROVAL, IF THERE IS NO OTHER OPTION.
v. USE OF A SEDIMENTATION BAG WITH DISCHARGE TO A DITCH OR SWALE FOR SMALL VOLUMES OF LOCALIZED DEWATERING.
vi. PERMITTEES MUST HANDLE HIGHLY TURBID OR CONTAMINATED DEWATERING WATER SEPARATELY FROM STORMWATER.

ELEMENT 11 - MAINTAIN BMPS

a. PERMITTEES MUST MAINTAIN AND REPAIR ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL BMPS AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION IN ACCORDANCE WITH BMP SPECIFICATIONS.
b. PERMITTEES MUST REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL BMPS WITHIN 30 DAYS AFTER ACHIEVING FINAL SITE STABILIZATION OR AFTER THE TEMPORARY BMPS ARE NO LONGER NEEDED.

ELEMENT 12 - MANAGE THE PROJECT

a. PHASE DEVELOPMENT PROJECTS TO THE MAXIMUM DEGREE PRACTICABLE AND TAKE INTO ACCOUNT SEASONAL WORK LIMITATIONS.
b. INSPECTION AND MONITORING - INSPECT, MAINTAIN AND REPAIR ALL BMPS AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. CONDUCT SITE INSPECTIONS AND MONITORING IN ACCORDANCE WITH SPECIAL CONDITION S4.
c. MAINTAINING AN UPDATED CONSTRUCTION SWPPP - MAINTAIN, UPDATE, AND IMPLEMENT THE SWPPP IN ACCORDANCE WITH SPECIAL CONDITIONS S3, S4 AND S9.

ELEMENT 13 - PROTECT LOW IMPACT DEVELOPMENT (LID) BMPS

a. THE PRIMARY PURPOSE OF LID BMPS/ON-SITE LID STORMWATER MANAGEMENT BMPS IS TO REDUCE THE DISRUPTION OF THE NATURAL SITE HYDROLOGY. LID BMPS ARE PERMANENT FACILITIES.
b. PERMITTEES MUST PROTECT ALL BIORETENTION AND RAIN GARDEN FACILITIES FROM SEDIMENTATION THROUGH INSTALLATION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL BMPS ON PORTIONS OF THE SITE THAT DRAIN INTO THE BIORETENTION AND/OR RAIN GARDEN FACILITIES. RESTORE THE FACILITIES TO THEIR FULLY FUNCTIONING CONDITION IF THEY ACCUMULATE SEDIMENT DURING CONSTRUCTION. RESTORING THE FACILITY MUST INCLUDE REMOVAL OF SEDIMENT AND ANY SEDIMENT-LADEN BIORETENTION/RAIN GARDEN SOILS, AND REPLACING THE REMOVED SOILS WITH SOILS MEETING THE DESIGN SPECIFICATION.
c. PERMITTEES MUST MAINTAIN THE INFILTRATION CAPABILITIES OF BIORETENTION AND RAIN GARDEN FACILITIES BY PROTECTING AGAINST COMPACTION BY CONSTRUCTION EQUIPMENT AND FOOT TRAFFIC. PROTECT COMPLETE LAWN AND LANDSCAPED AREAS FROM COMPACTION DUE TO CONSTRUCTION EQUIPMENT.
d. PERMITTEES MUST CONTROL EROSION AND AVOID INTRODUCING SEDIMENT FROM SURROUNDING LAND USES ONTO PERMEABLE PAVEMENTS. DO NOT ALLOW MUDDY CONSTRUCTION EQUIPMENT ON THE BASE MATERIAL OR PAVEMENT. DO NOT ALLOW SEDIMENT-LADEN RUNOFF ONTO PERMEABLE PAVEMENTS.
e. PERMITTEES MUST CLEAN PERMEABLE PAVEMENTS FOULED WITH SEDIMENTS OR NO LONGER PASSING AN INITIAL INFILTRATION TEST USING LOCAL STORMWATER MANUAL METHODOLOGY OR THE MANUFACTURER'S PROCEDURES.
f. PERMITTEES MUST KEEP ALL HEAVY EQUIPMENT OFF EXISTING SOILS UNDER LID FACILITIES THAT HAVE BEEN EXCAVATED TO FINAL GRADE TO RETAIN THE INFILTRATION RATE OF THE SOILS.

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THOMAS M. WELLER — STATE OF WASHINGTON — 36609 — REGISTERED PROFESSIONAL ENGINEER
2/3/2020

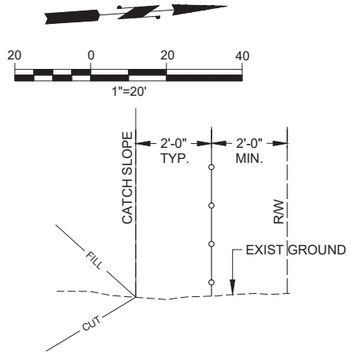
DESIGNED: T. WELLER	DRAWN: M. SCHAEFER
DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: N/A	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

TEMPORARY EROSION AND SEDIMENT CONTROL NOTES

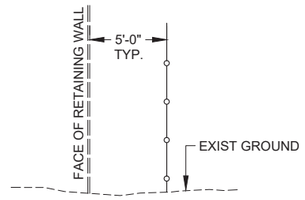
DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: C2.03
SHEET NO: 9 OF 61

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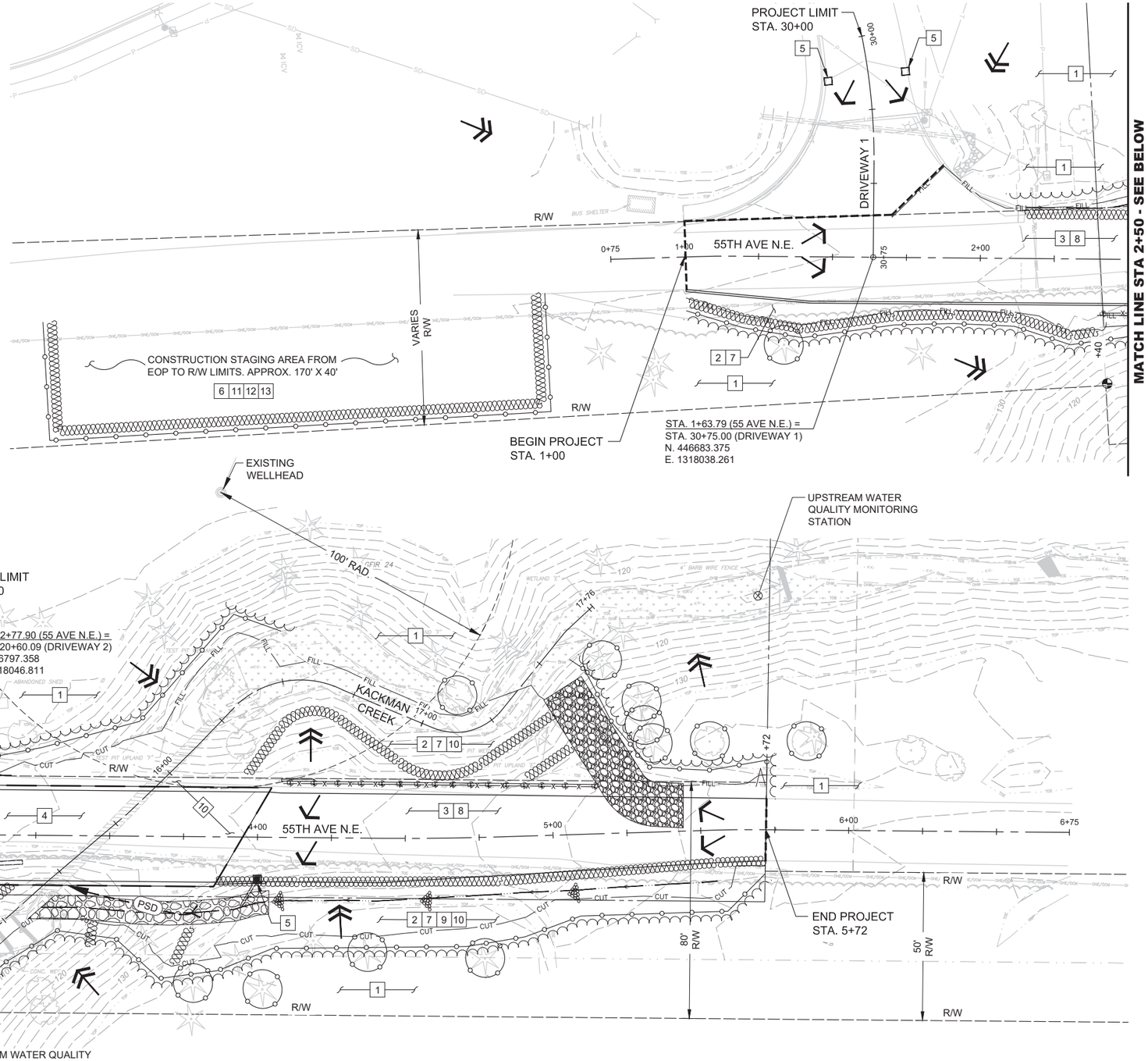
DETAIL "A" HVF OR SILT FENCE INSTALLATION (TYP)

N.T.S



DETAIL "B" HVF INSTALLATION (TYP)

N.T.S



GENERAL NOTES:

1. REFER TO THE WASHINGTON STATE DOE STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON, CURRENT EDITION, FOR ADDITIONAL TESC INSTALLATION & LAYOUT REQUIREMENTS.
2. FOR ALL AREAS OF DISTURBANCE WITHIN THE 100 FT RIPARIAN BUFFER, PERMANENT RESTORATION SHALL OCCUR IN ACCORDANCE WITH THE "PLANTING PLANS" PER THESE PLANS AND THE SPECIAL PROVISIONS.
3. SEE DRAWING G1.01 FOR ABBREVIATIONS AND LEGEND.

XX CONSTRUCTION NOTES:

1. PRESERVE EXISTING VEGETATION (BMP C101)
2. SEEDING, MULCHING, & AMENDED TOPSOIL (BMP C120, C121 & C125)
3. STREET CLEANING (BMP C140)
4. CONCRETE HANDLING (BMP C151)
5. STORM DRAIN INLET PROTECTION (BMP C220)
6. MATERIALS ON HAND (BMP C150)
7. SURFACE ROUGHENING (BMP C130)
8. DUST CONTROL (BMP C140)
9. GRASS LINED CHANNEL (BMP C201)
10. NETS AND BLANKETS FOR LINING SLOPES 2:1 AND STEEPER (BMP C122)
11. MATERIAL DELIVERY, STORAGE AND CONTAINMENT (BMP C153)
12. CONSTRUCTION STAGING / PARKING AREA STABILIZATION W / BARK MULCH (BMP C107)
13. PLASTIC COVERING (BMP C123)

LEGEND

- HIGH VISIBILITY FENCE (HVF) (BMP C103). SEE DETAILS EC-A & EC-B
- STABILIZED CONSTRUCTION ENTRANCE (BMP C105)
- SAWCUTTING LIMITS (BMP C152)
- TEMPORARY PIPE SLOPE DRAIN 12" Ø (BMP C204)
- PERMANENT ROCK CHECK DAM (BMP C207)
- TRIANGULAR SILT DIKE (BMP C208)
- INLET PROTECTION (BMP C220)
- HIGH VISIBILITY SILT FENCE (BMP C233). SEE DETAIL EC-A
- STRAW WATTLES (BMP C235) SIZE AND SPACED AS NEED FOR SITE CONDITIONS
- LIMITS OF VEGETATION REMOVAL
- PROPOSED DITCH
- DRAINAGE FLOW DIRECTION ARROWS (SHEET FLOW, OR SHALLOW CHANNEL FLOW) ON ROADWAY
- DRAINAGE FLOW DIRECTION ARROWS (SHEET FLOW, OR SHALLOW CHANNEL FLOW) OFF ROADWAY

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THOMAS M. WELLER STATE OF WASHINGTON 36609 REGISTERED PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: T. WELLER	DRAWN: M. SCHAEFER
DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

TEMPORARY EROSION AND SEDIMENT CONTROL PLAN 1

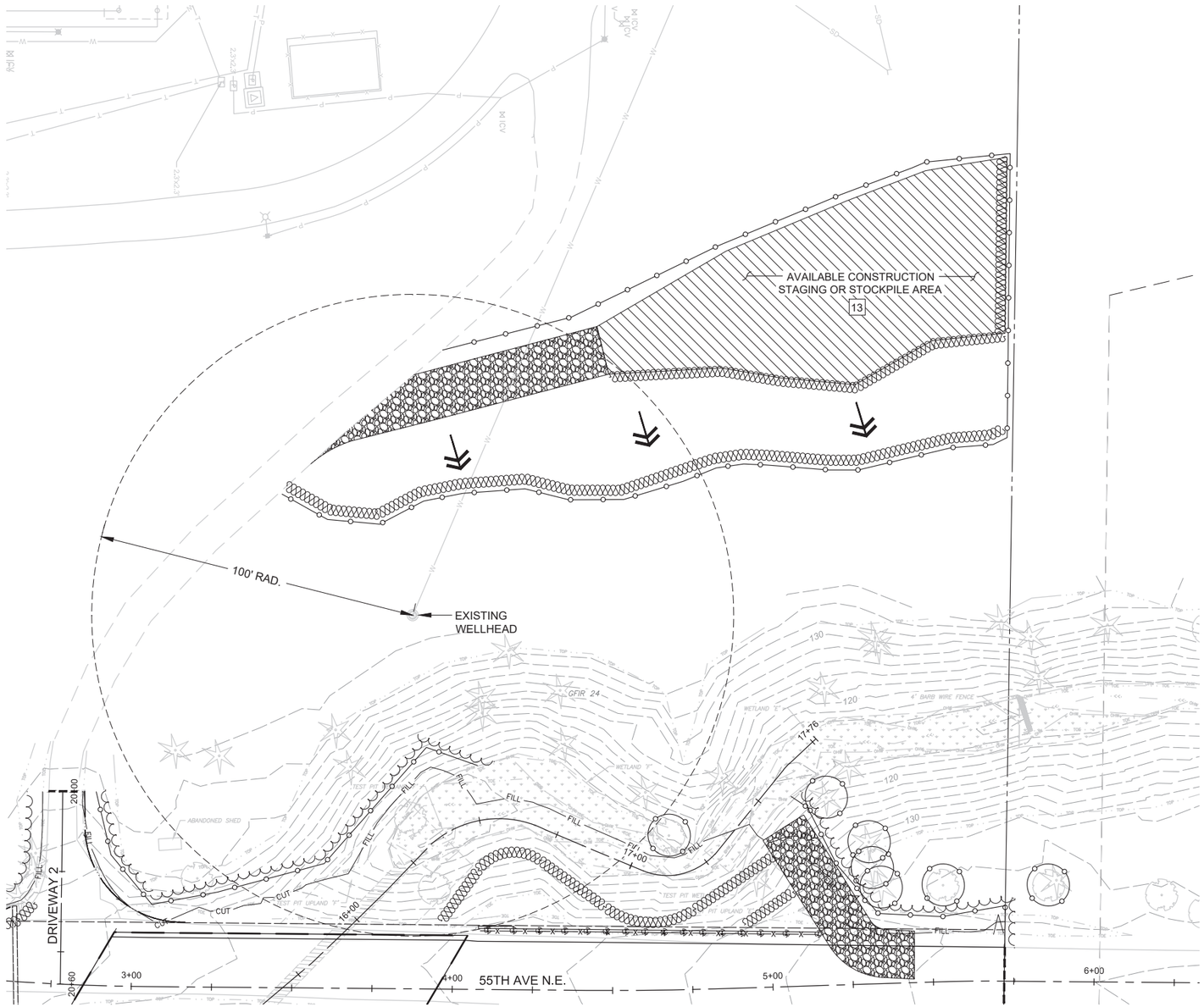
DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: C2.04
SHEET NO: 10 OF 61

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20 0 20 40
1"=20'



GENERAL NOTES:

1. REFER TO THE WASHINGTON STATE DOE STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON, CURRENT EDITION, FOR ADDITIONAL TESC INSTALLATION & LAYOUT REQUIREMENTS.
2. FOR ALL AREAS OF DISTURBANCE WITHIN THE 100 FT RIPARIAN BUFFER, PERMANENT RESTORATION SHALL OCCUR IN ACCORDANCE WITH THE "PLANTING PLANS" PER THESE PLANS AND THE SPECIAL PROVISIONS.
3. SEE DRAWING G1.01 FOR ABBREVIATIONS AND LEGEND.

XX CONSTRUCTION NOTES:

1. PRESERVE EXISTING VEGETATION (BMP C101)
2. SEEDING, MULCHING, & AMENDED TOPSOIL (BMP C120, C121 & C125)
3. STREET CLEANING (BMP C140)
4. CONCRETE HANDLING (BMP C151)
5. STORM DRAIN INLET PROTECTION (BMP C220)
6. MATERIALS ON HAND (BMP C150)
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13. PLASTIC COVERING (BMP C123)

LEGEND

- HIGH VISIBILITY FENCE (HVF) (BMP C103). SEE DETAILS EC-A & EC-B
- STABILIZED CONSTRUCTION ENTRANCE (BMP C105)
- SAWCUTTING LIMITS (BMP C152)
- PSD — TEMPORARY PIPE SLOPE DRAIN 12" Ø (BMP C204)
- PERMANENT ROCK CHECK DAM (BMP C207)
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- INLET PROTECTION (BMP C220)
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- STRAW WATTLES (BMP C235) SIZE AND SPACED AS NEED FOR SITE CONDITIONS
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- DRAINAGE FLOW DIRECTION ARROWS (SHEET FLOW, OR SHALLOW CHANNEL FLOW) OFF ROADWAY

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2/3/2020

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DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

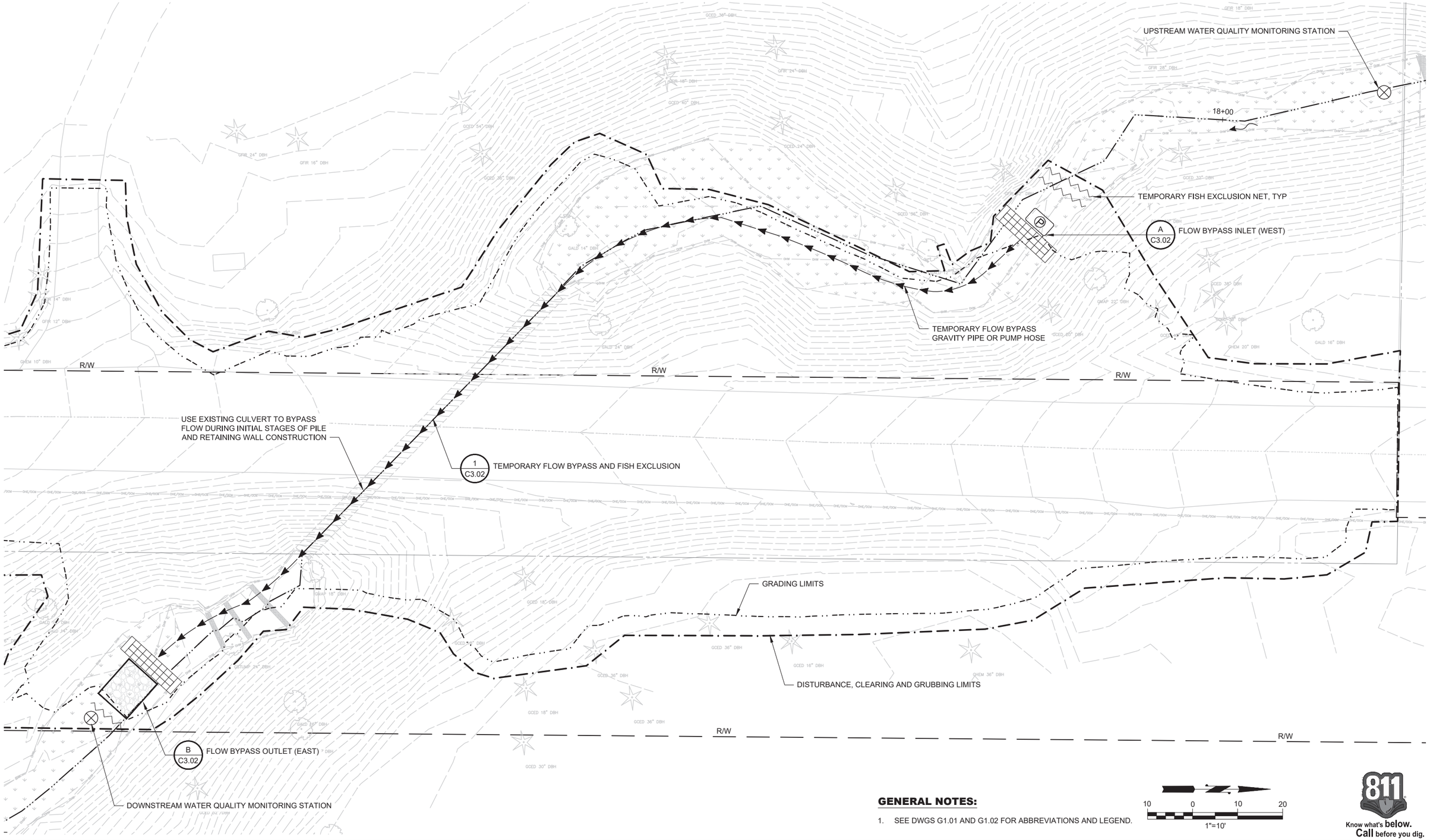
TEMPORARY EROSION AND SEDIMENT CONTROL PLAN 2

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: C2.05
SHEET NO: 11 OF 61

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GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.

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IAN R. MOSTRENKO
STATE OF WASHINGTON
56069
REGISTERED
PROFESSIONAL ENGINEER

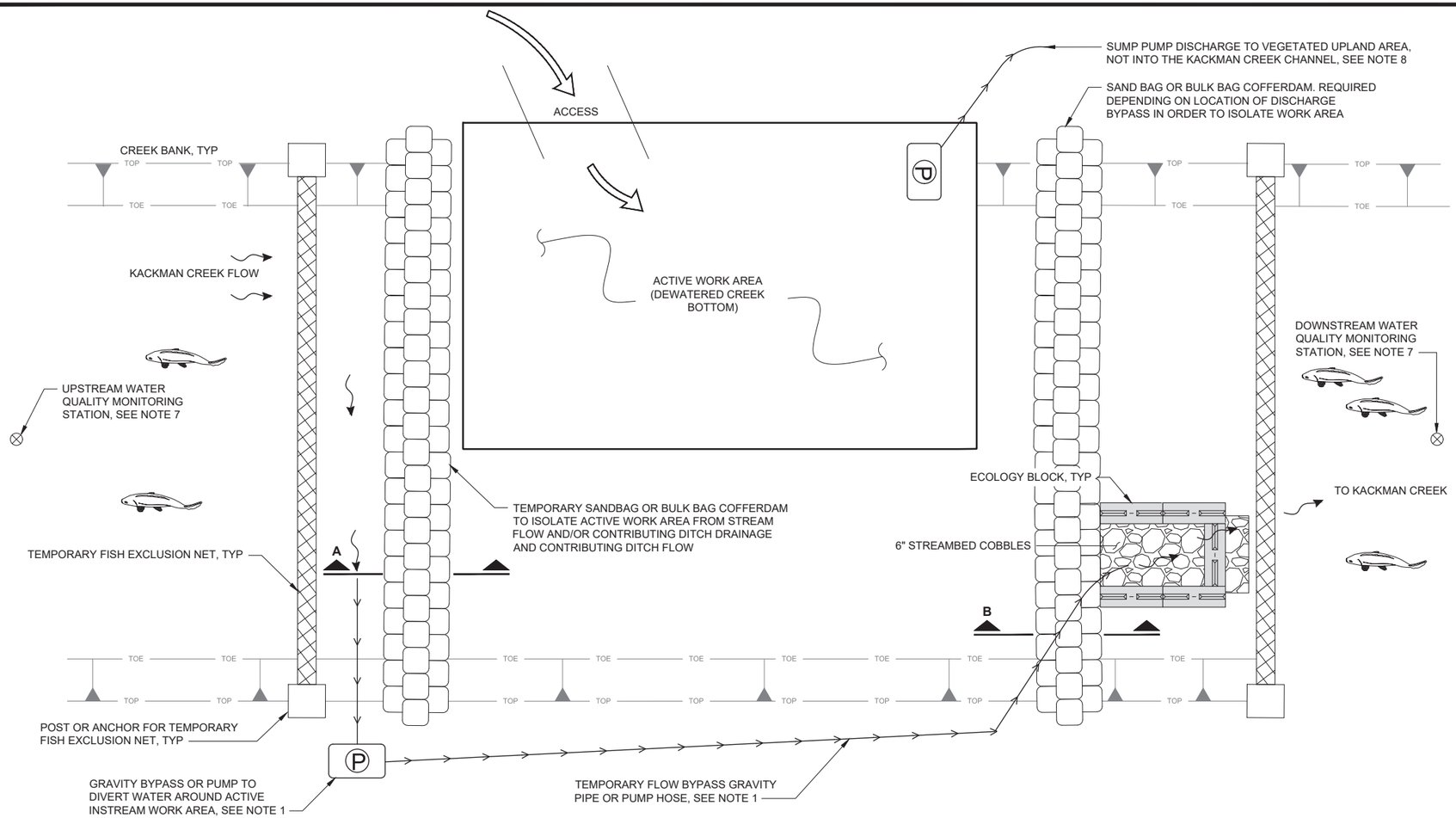
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DESIGNED: C. AVOLIO	DRAWN:
DESIGNED:	CHECKED: M. EWBANK
SCALE:	APPROVED: I. MOSTRENKO

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

FLOW BYPASS AND FISH EXCLUSION PLAN

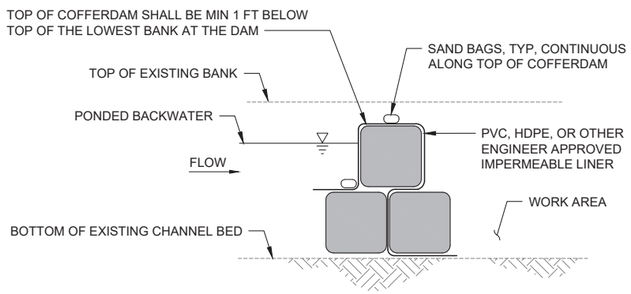
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PROJECT NO:	15-06057-005
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SHEET NO:	12 OF 61

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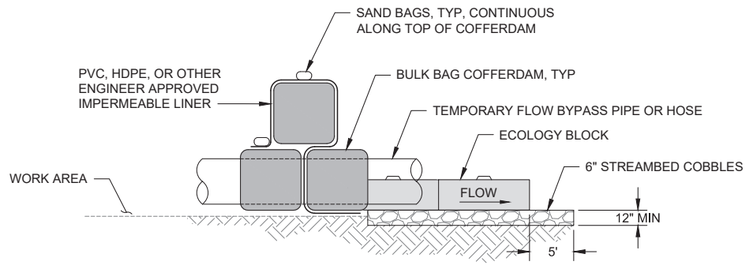
DETAIL - TEMPORARY FLOW BYPASS AND FISH EXCLUSION PLAN (1 / C3.01)

SCALE: NTS



SECTION - FLOW BYPASS INLET (WEST) (A / C3.01)

SCALE: NTS



SECTION - FLOW BYPASS OUTLET (EAST) (B / C3.01)

SCALE: NTS

GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.

NOTES:

1. THIS FLOW BYPASS AND FISH EXCLUSION SCHEMATIC REPRESENTS THE MINIMUM FLOW BYPASS REQUIREMENTS. ALTERNATIVE PROPOSALS FOR FLOW BYPASS MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL AND ANY ADJUSTMENTS WILL BE MADE AT THE CONTRACTOR'S EXPENSE. CONDITIONS OF PROJECT PERMITS AND EASEMENTS MUST BE FOLLOWED AT ALL TIMES. SEE CONTRACT SPECIFICATIONS.
2. ALL TEMPORARY FLOW BYPASS EQUIPMENT, PIPES AND HOSES SHALL BE LOCATED AND ALIGNED WITHIN THE PERMANENT AND TEMPORARY CONSTRUCTION EASEMENTS, SEE CONTRACT SPECIFICATIONS.
3. ALL EXCAVATIONS THAT HAVE POTENTIAL TO IMPACT THE WETTED CHANNEL SHALL BE ISOLATED FROM THE ACTIVE FLOW BY THE CONTRACTOR. ISOLATION MEANS SHALL CONSIST OF A TEMPORARY FLOW BARRIER TO DIVERT WATER AROUND THE ACTIVE WORK AREA. CONTRACTOR SHALL USE EVERY MEASURE POSSIBLE TO MINIMIZE TURBIDITY DISCHARGES INTO KACKMAN CREEK AND SHALL STOP CONSTRUCTION AS DIRECTED BY ENGINEER IF TURBIDITY EXCEEDS PERMITTED LEVELS. COFFERDAM CONSTRUCTION SHALL NOT COMMENCE UNTIL THE UPSTREAM AND DOWNSTREAM TEMPORARY FISH EXCLUSION NETS HAVE BEEN INSTALLED OR COFFERDAM AND FISH REMOVAL IS COMPLETE. SEE NOTE 4.
4. FISH EXCLUSION AND FISH REMOVAL WORK TO BE PERFORMED BY THE CONTRACTOR AND MUST BE TIMED AND COORDINATED WITH STREAM FLOW BYPASS PER THE WSDOT FISH EXCLUSION PROTOCOLS AND STANDARDS (AUGUST 2006) AND THE REQUIREMENTS OF THE HYDRAULIC PROJECT APPROVAL PERMIT. TEMPORARY FISH EXCLUSION NET MUST REMAIN IN PLACE DURING INSTREAM WORK AND COFFERDAM REMOVAL.
5. SIZE, QUANTITY AND CONFIGURATION OF BULK BAGS SHOWN FOR COFFERDAMS ARE CONCEPTUAL ONLY AND WILL VARY FROM THAT SHOWN. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING APPROPRIATE SIZE, QUANTITY AND CONFIGURATION OF BULK BAGS AND/OR SANDBAGS NECESSARY TO BYPASS FLOW AND ISOLATE THE WORK AREA AND ENABLE SUCCESSFUL OPERATION OF BYPASS SYSTEM AND MINIMIZE FLOW LEAKAGE TO THE EXTENT NECESSARY TO COMPLETE CONSTRUCTION AND CONFORM TO PERMIT REQUIREMENTS. MINOR EXCAVATION OF BANKS WILL BE ALLOWED TO KEY-IN BULK BAGS AS NECESSARY TO MINIMIZE FLOW LEAKAGE AND COMPLETE INSTALLATION OF COFFERDAM. ALL BULK BAGS SHALL BE FILLED WITH CLEAN WASHED ROUNDED GRAVEL AND SANDBAGS FILLED WITH CLEAN, WASHED SAND.
6. TEMPORARY PUMPING OF CREEK AND DITCH FLOWS DURING INSTALLATION AND REMOVAL OF UPSTREAM COFFERDAM AND DOWNSTREAM OUTLET ENERGY DISSIPATER, AND DURING ALL INSTREAM CONSTRUCTION, WILL BE REQUIRED EXCEPT DURING HIGH FLOWS. SEE CONTRACT SPECIFICATIONS REGARDING FLOW BYPASS REQUIREMENTS DURING HIGH FLOWS. BYPASS PUMPS AND PIPES TO BE PROTECTED FROM CONSTRUCTION ACTIVITIES AT ALL TIMES. SOME TEMPORARY PIPE ANCHORING MAY BE REQUIRED, SEE CONTRACT SPECIFICATIONS.
7. WATER QUALITY MONITORING STATIONS TO BE LOCATED UPSTREAM AND DOWNSTREAM OF FLOW BYPASS SYSTEM PER PROJECT PERMITS.
8. GROUNDWATER WILL BE ENCOUNTERED IN EXCAVATIONS. CONTRACTOR SHALL DEWATER AS NECESSARY FOR CONSTRUCTION AND INSPECTION. ALL DEWATERING WATER SHALL BE DISCHARGED TO UPLAND AREAS OR AN EROSION CONTROL BMP AS APPROVED BY THE ENGINEER. THE WATER SHALL NOT BE DIRECTLY DISCHARGED INTO KACKMAN CREEK. EROSION CONTROL BMPs MAY BE NECESSARY TO ENSURE THAT DEWATERING ACTIVITIES SHALL NOT IMPACT WATER QUALITY IN KACKMAN CREEK NOR CAUSE EROSION WHEN DISCHARGED TO UPLAND AREAS.
9. THE FLOW BYPASS AND FISH EXCLUSION SYSTEM SHALL BE MAINTAINED 24 HOURS PER DAY DURING CONSTRUCTION AND MONITORED BY THE CONTRACTOR DURING WORKING AND NON-WORKING HOURS.
10. CONTRACTOR SHALL REMOVE ALL TEMPORARY FLOW BYPASS MATERIALS FOLLOWING CONSTRUCTION AND FULLY RESTORE DISTURBED AREAS TO PRE-CONSTRUCTION CONDITIONS.

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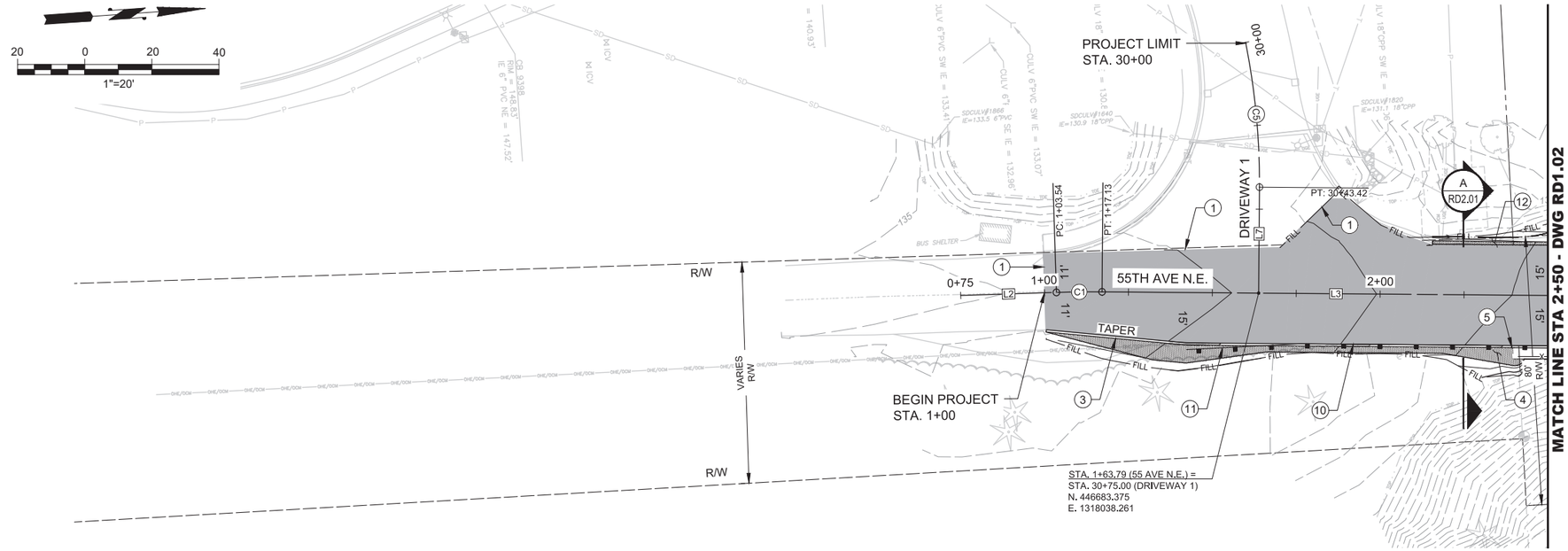
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DESIGNED: C. AVOLIO	DRAWN:
DESIGNED:	CHECKED: M. EWBANK
SCALE:	APPROVED: I. MOSTRENKO

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

FLOW BYPASS AND FISH EXCLUSION DETAILS

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: C3.02
SHEET NO: 13 OF 61

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GENERAL NOTES:

1. FOR DESIGN RELATED TO KACKMAN CREEK, SEE STREAM DRAWINGS.
2. FOR DESIGN RELATED TO BRIDGE & WALLS, SEE STRUCTURAL DRAWINGS.
3. SEE DRAWING G1.01 FOR ABBREVIATIONS AND LEGEND.
4. FOR TABLES RELATED TO PIPES AND CATCH BASINS, SEE SHEET RD1.03.

(#) CONSTRUCTION NOTES:

1. AT PAVING LIMITS. NEAT LINE CUT, CLEAN, HEAT, AND TACK EDGES WITH SEALER SCC-1 AND SEAL WITH AR4000 AND SAND.
2. CONSTRUCT RESIDENTIAL DRIVEWAY APPROACH - ASPHALT PER SNOHOMISH COUNTY PUBLIC WORKS STD PLAN 2-030.
3. INSTALL TYPE 2 HMA EXTRUDED CURB PER WSDOT STD PLAN F-10.42.
4. EMBANKMENT WIDENING PER WSDOT STD. PLAN A-50.10.
5. INSTALL BEAM GUARDRAIL TRANSITION PER WSDOT STD. PLAN C-25.30.
6. INSTALL TYPE 4 CHAIN LINK FENCE PER WSDOT STD. PLAN L-20.10.
7. INSTALL STANDARD BRIDGE RAIL PER SNOHOMISH COUNTY PUBLIC WORKS STD. PLAN 6-040.
8. INSTALL BEAM GUARDRAIL TYPE 10 PER WSDOT STD. PLAN C-1A.
9. INSTALL GUARDRAIL CONNECTION TO BRIDGE RAIL.
10. INSTALL BEAM GUARDRAIL TYPE 31 PER WSDOT STD PLAN C-20.10.
11. INSTALL BEAM GUARDRAIL TYPE 31 NON-FLARED TERMINAL WITH WIDENED EMBANKMENT PER WSDOT STD PLAN C-22.45.
12. SEE SHEET RD1.03 FOR STORM DRAIN DETAILS.
13. INSTALL CATCH BASIN TYPE 1L PER WSDOT STD PLAN B-5.40.
14. INSTALL CATCH BASIN TYPE 2 PER WSDOT STD PLAN B 10.20.
15. INSTALL SCHEDULE "A" STORM SEWER PIPE 8 IN. DIAM.
16. INSTALL SCHEDULE "A" STORM SEWER PIPE 12 IN. DIAM.
17. INSTALL PIPE OUTLET PROTECTION PER DETAIL "A" SHEET RD1.03.
18. ROCK LINED DITCH. SEE SHEET ST1.02.

55TH AVE NE - ALIGNMENT DATA

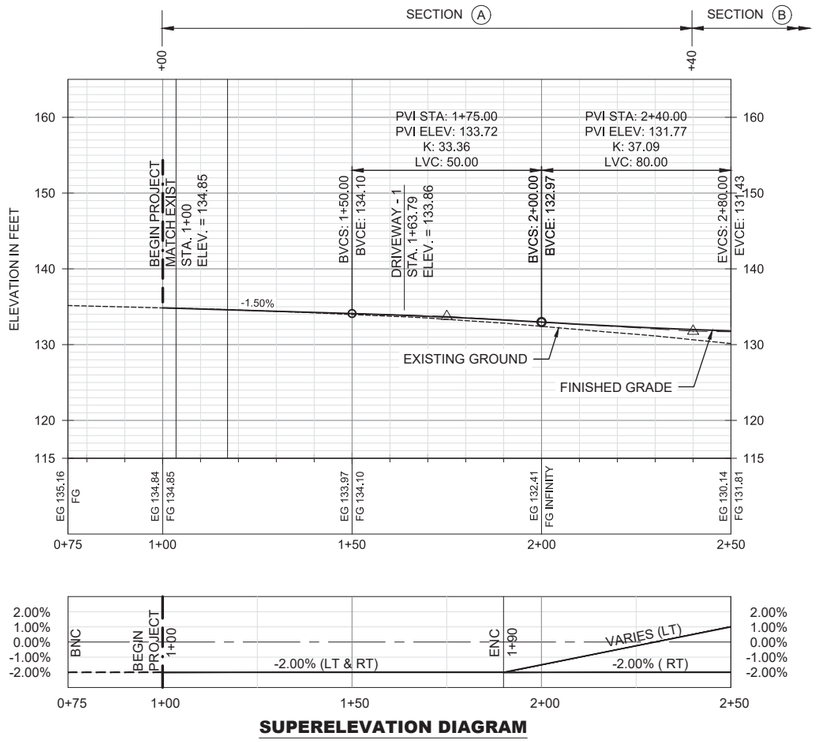
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C1	1+03.54	N: 446,623.49 - E: 1,318,033.85	1+17.13	N: 446,637.06 - E: 1,318,034.63	2° 17' 26"	340.00'	6.80'	13.59'	
L3	1+17.13	N: 446,637.06 - E: 1,318,034.63	2+56.50	N: 446,776.01 - E: 1,318,045.47				139.37'	N04°27'41"E
C2	2+56.50	N: 446,776.01 - E: 1,318,045.47	3+04.96	N: 446,824.41 - E: 1,318,047.57	3° 57' 58"	700.00'	24.24'	48.45'	
L4	3+04.96	N: 446,824.41 - E: 1,318,047.57	4+41.78	N: 446,961.23 - E: 1,318,048.75				136.82'	N00°29'43"E
C3	4+41.78	N: 446,961.23 - E: 1,318,048.75	4+81.79	N: 447,001.23 - E: 1,318,048.30	2° 17' 33"	1000.00'	20.01'	40.01'	
L5	4+81.79	N: 447,001.23 - E: 1,318,048.30	5+54.98	N: 447,074.39 - E: 1,318,046.00				73.19'	N01°47'50"W
C4	5+54.98	N: 447,074.39 - E: 1,318,046.00	5+68.60	N: 447,088.00 - E: 1,318,045.85	2° 17' 40"	340.00'	6.81'	13.62'	
L6	5+68.60	N: 447,088.00 - E: 1,318,045.85	6+74.68	N: 447,194.08 - E: 1,318,046.77				106.08'	N00°29'51"E

DRIVEWAY 1 - ALIGNMENT DATA

#	START STA.	START COORDINATES	END STA.	END COORDINATES	DELTA (Δ)	RADIUS	TANGENT	LENGTH	DIRECTION
C5	30+00.00	N: 446,684.93 - E: 1,317,963.45	30+43.42	N: 446,686.03 - E: 1,318,006.78	11° 50' 50"	210.00'	21.79'	43.42'	
L7	30+43.42	N: 446,686.03 - E: 1,318,006.78	30+75.00	N: 446,683.58 - E: 1,318,038.26				31.57'	S85°32'19"E

DRIVEWAY 2 - ALIGNMENT DATA

#	START STA.	START COORDINATES	END STA.	END COORDINATES	LENGTH	DIRECTION
L8	20+00.00	N: 446,798.14 - E: 1,317,986.72	20+60.09	N: 446,797.36 - E: 1,318,046.81	60.09'	S89°15'25"E



SUPERELEVATION DIAGRAM

TRANTECH Engineering LLC
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No.	REVISION	BY	APP'D	DATE

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STILLAGUAMISH stulǝgʷa'bš VILLAGE

HERRERA

THOMAS M. WELLER STATE OF WASHINGTON 36699 REGISTERED PROFESSIONAL ENGINEER
2/3/2020

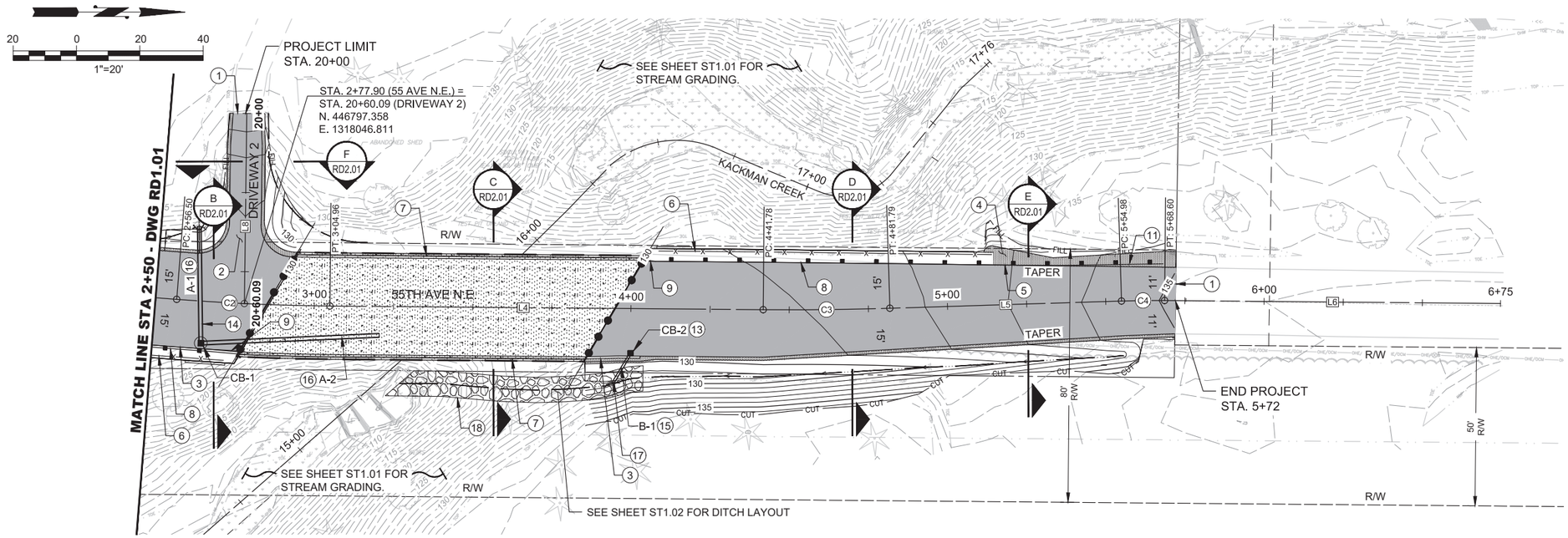
DESIGNED: T. WELLER	DRAWN: M. SCHAEFER
DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: H 1:20, V: 1:10	APPROVED: C. AVOLIO

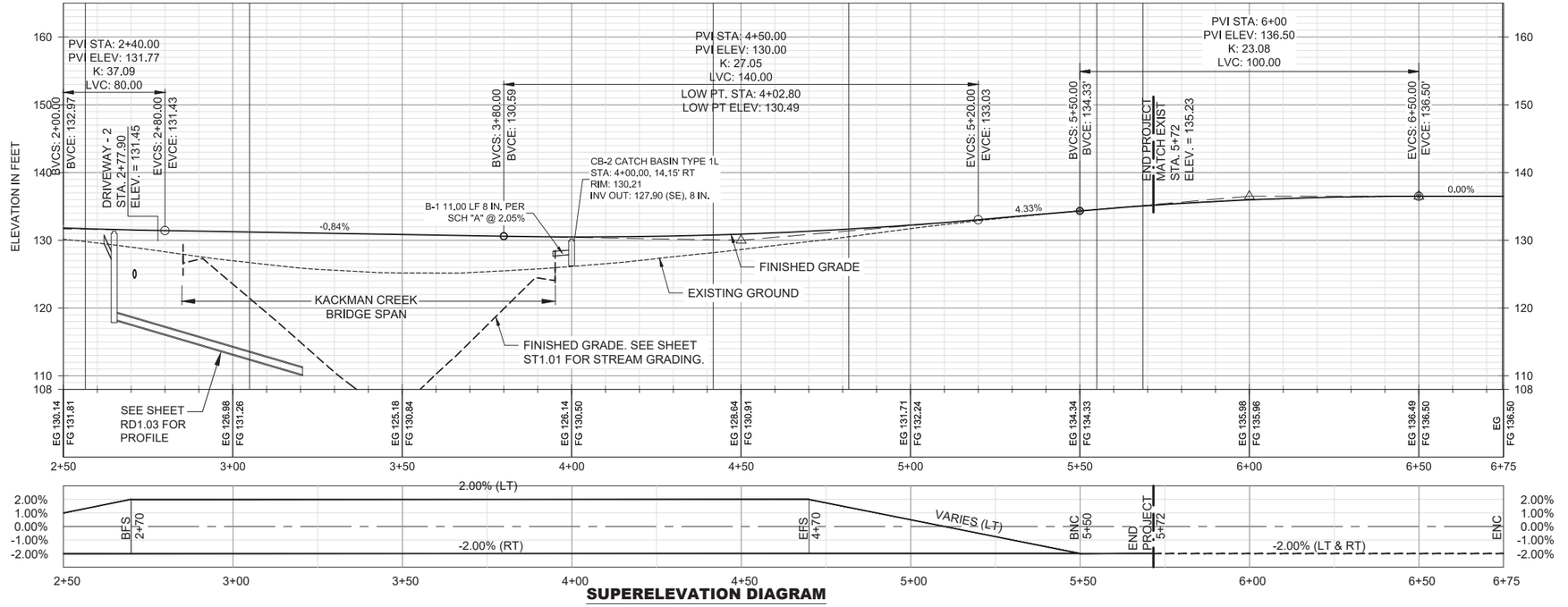
KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

ROADWAY PLAN AND PROFILE 1

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	RD1.01
SHEET NO:	14 OF 61

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SUPERELEVATION DIAGRAM

GENERAL NOTES:

1. FOR DESIGN RELATED TO KACKMAN CREEK, SEE STREAM DRAWINGS.
2. FOR DESIGN RELATED TO BRIDGE & WALLS, SEE STRUCTURAL DRAWINGS.
3. SEE DRAWING G1.01 FOR ABBREVIATIONS AND LEGEND.
4. FOR TABLES RELATED TO PIPES AND CATCH BASINS, SEE SHEET RD1.03.

(#) CONSTRUCTION NOTES:

1. AT PAVING LIMITS. NEAT LINE CUT, CLEAN, HEAT, AND TACK EDGES WITH SEALER SCC-1 AND SEAL WITH AR4000 AND SAND.
2. CONSTRUCT RESIDENTIAL DRIVEWAY APPROACH - ASPHALT PER SNOHOMISH COUNTY PUBLIC WORKS STD PLAN 2-030.
3. INSTALL TYPE 2 HMA EXTRUDED CURB PER WSDOT STD PLAN F-10.42.
4. EMBANKMENT WIDENING PER WSDOT STD. PLAN A-50.10.
5. INSTALL BEAM GUARDRAIL TRANSITION PER WSDOT STD. PLAN C-25.30.
6. INSTALL TYPE 4 CHAIN LINK FENCE PER WSDOT STD. PLAN L-20.10.
7. INSTALL STANDARD BRIDGE RAIL PER SNOHOMISH COUNTY PUBLIC WORKS STD. PLAN 6-040.
8. INSTALL BEAM GUARDRAIL TYPE 10 PER WSDOT STD. PLAN C-1A.
9. INSTALL GUARDRAIL CONNECTION TO BRIDGE RAIL.
10. INSTALL BEAM GUARDRAIL TYPE 31 PER WSDOT STD PLAN C-20.10.
11. INSTALL BEAM GUARDRAIL TYPE 31 NON-FLARED TERMINAL WITH WIDENED EMBANKMENT PER WSDOT STD PLAN C-22.45.
12. SEE SHEET RD1.03 FOR STORM DRAIN DETAILS.
13. INSTALL CATCH BASIN TYPE 1L PER WSDOT STD PLAN B-5.40.
14. INSTALL CATCH BASIN TYPE 2 PER WSDOT STD PLAN B 10.20.
15. INSTALL SCHEDULE "A" STORM SEWER PIPE 8 IN. DIAM.
16. INSTALL SCHEDULE "A" STORM SEWER PIPE 12 IN. DIAM.
17. INSTALL PIPE OUTLET PROTECTION PER DETAIL "A" SHEET RD1.03.
18. ROCK LINED DITCH. SEE SHEET ST1.02.

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STILLAGUAMISH stulǝgʷa'bš VILLAGE

HERRERA

THOMAS M. WELLER STATE OF WASHINGTON 36659 REGISTERED PROFESSIONAL ENGINEER
2/3/2020

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DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: H 1:20, V: 1:10	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

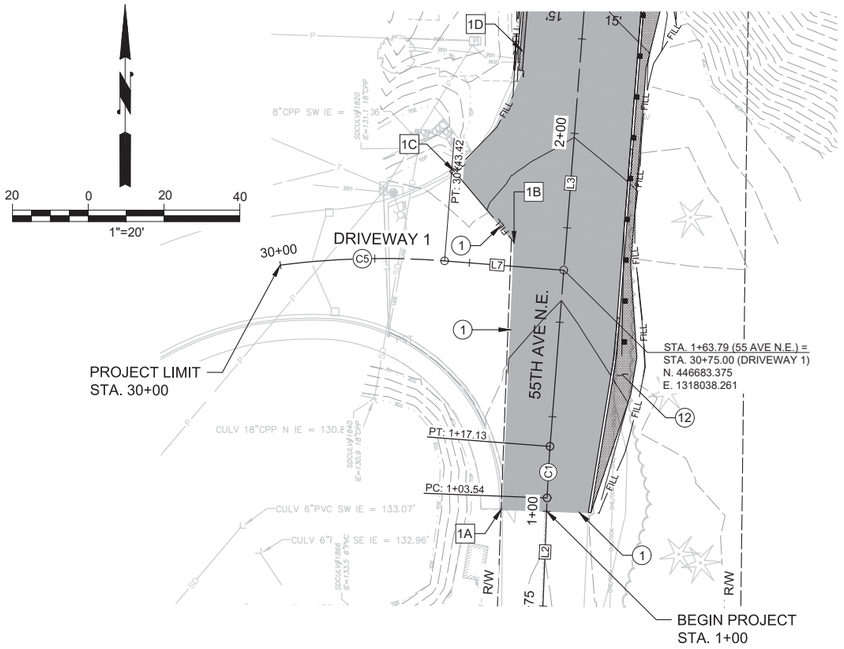
ROADWAY PLAN AND PROFILE 2

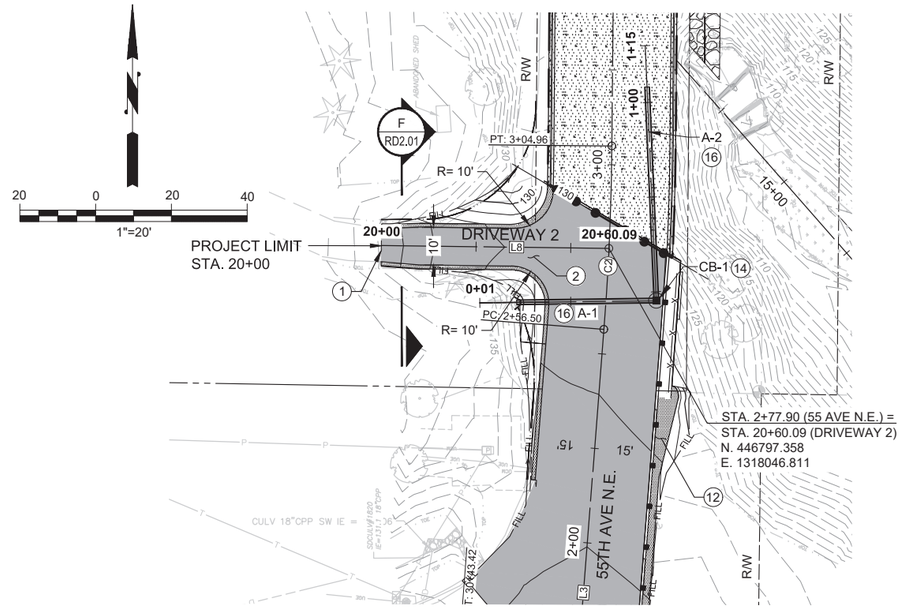
DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	RD1.02
SHEET NO:	15 OF 61

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GENERAL NOTES:

1. FOR DESIGN RELATED TO KACKMAN CREEK, SEE STREAM DRAWINGS.
2. FOR DESIGN RELATED TO BRIDGE & WALLS, SEE STRUCTURAL DRAWINGS.
3. SEE DRAWING G1.01 FOR ABBREVIATIONS AND LEGEND.
4. FOR TABLES RELATED TO PIPES AND CATCH BASINS, SEE SHEET RD1.03.

(#) CONSTRUCTION NOTES:

1. AT PAVING LIMITS. NEAT LINE CUT, CLEAN, HEAT, AND TACK EDGES WITH SEALER SCC-1 AND SEAL WITH AR4000 AND SAND.
2. CONSTRUCT RESIDENTIAL DRIVEWAY APPROACH - ASPHALT PER SNOHOMISH COUNTY PUBLIC WORKS STD PLAN 2-030.
3. INSTALL TYPE 2 HMA EXTRUDED CURB PER WSDOT STD PLAN F-10.42.
4. EMBANKMENT WIDENING PER WSDOT STD. PLAN A-50.10.
5. INSTALL BEAM GUARDRAIL TRANSITION PER WSDOT STD. PLAN C-25.30.
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7. INSTALL STANDARD BRIDGE RAIL PER SNOHOMISH COUNTY PUBLIC WORKS STD. PLAN 6-040.
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12. SEE SHEET RD1.03 FOR STORM DRAIN DETAILS.
13. INSTALL CATCH BASIN TYPE 1L PER WSDOT STD PLAN B-5.40.
14. INSTALL CATCH BASIN TYPE 2 PER WSDOT STD PLAN B 10.20.
15. INSTALL SCHEDULE "A" STORM SEWER PIPE 8 IN. DIAM.
16. INSTALL SCHEDULE "A" STORM SEWER PIPE 12 IN. DIAM.
17. INSTALL PIPE OUTLET PROTECTION PER DETAIL "A" SHEET RD1.03.
18. ROCK LINED DITCH. SEE SHEET ST1.02.

FINISHED GRADE TABLE FOR DRIVEWAY 1

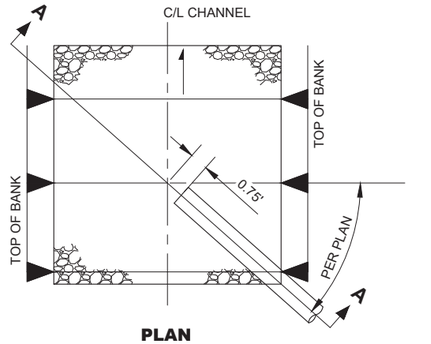
PNT #	DESC.	STATION	OFFSET	ELEV.
1A	FIN-BOC	1+00.00	12.00' LT	134.59
1B	FIN-EOP	1+70.00	13.65' LT	133.33
1C	FIN-EOP	1+87.51	30.80' LT	132.67
1D	FIN-EOP	2+15.55	15.00' LT	132.43

PIPE SCHEDULE

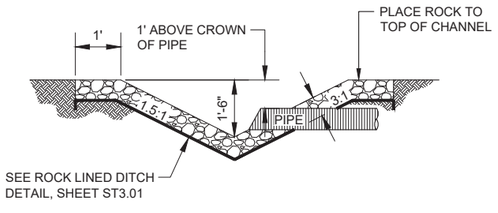
NO.	SIZE	TYPE	LENGTH	SLOPE	INVERT	STATION & OFFSET
A-1	12"	SCHEDULE "A"	37LF	8.90%	129.63' 126.35'	2+62.00, 23.50' LT 2+65.00, 13.25' RT
A-2	12"	SCHEDULE "A"	57 LF	14.50%	118.35' 110.17'	2+71.00, 13.25' RT 3+20.60, 9.15' RT
B-1	8"	SCHEDULE "A"	11 LF	2.05%	127.90' 127.67'	4+00.00, 14.25' RT 3+94.47, 23.66' RT

CATCH BASIN SCHEDULE

NO.	TYPE	PIPES
CB-1	TYPE 2 RIM=131.35' STA=2+65.00 13.25' RT	A-1, 12" Ø SCHEDULE "A" INV IN =126.35 (W) A-2, 12 Ø SCHEDULE "A" INV OUT = 118.35' (N)
CB-2	TYPE 1L RIM=130.21' STA=4+00.00 14.25' RT	B-1, 8" Ø SCHEDULE "A" INV OUT=127.90 (SE)



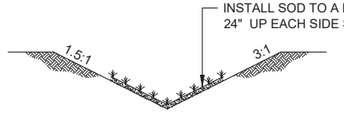
PLAN



SECTION A-A

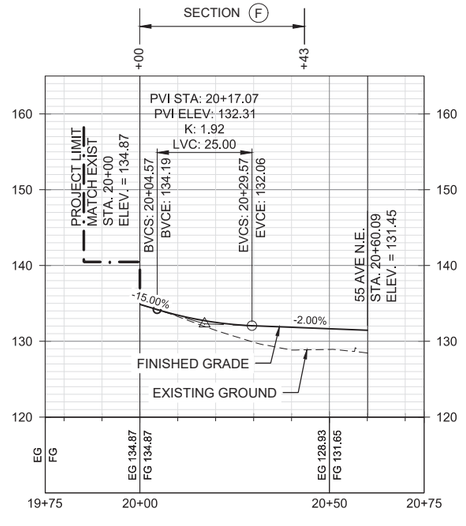
"LATERAL" OUTLET PROTECTION (A)

SCALE: NTS

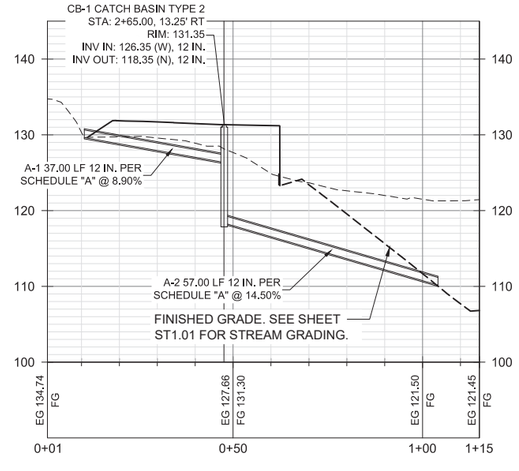


GRASS-LINED CHANNEL

SCALE: NTS



DRIVEWAY 2 PROFILE



DRAINAGE PROFILE

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HERRERA

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2/3/2020

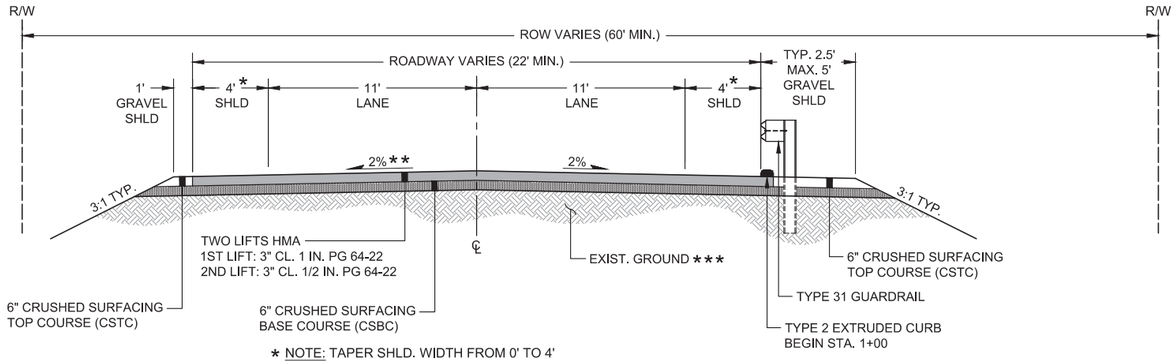
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DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: H 1:20, V: 1:10	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

ROADWAY PLAN AND PROFILE 3

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	RD1.03
SHEET NO: / OF	16 / 61

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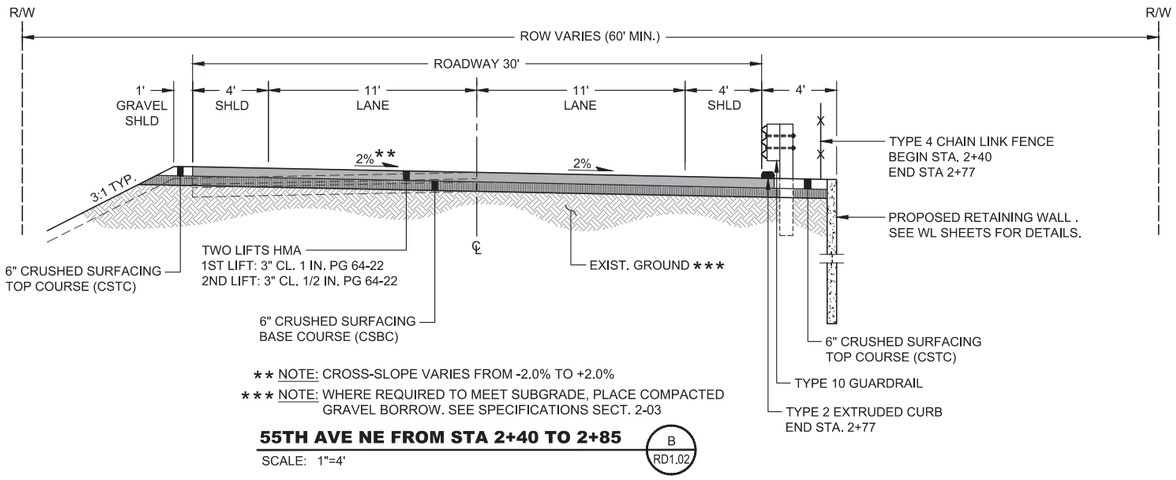
* NOTE: TAPER SHLD. WIDTH FROM 0' TO 4'

** NOTE: CROSS-SLOPE VARIES FROM -2.0% TO +2.0%

*** NOTE: WHERE REQUIRED TO MEET SUBGRADE, PLACE COMPACTED GRAVEL BORROW. SEE SPECIFICATIONS SECT. 2-03

55TH AVE NE FROM STA 1+00 TO 2+40 (A / RD1.01)

SCALE: 1"=4'

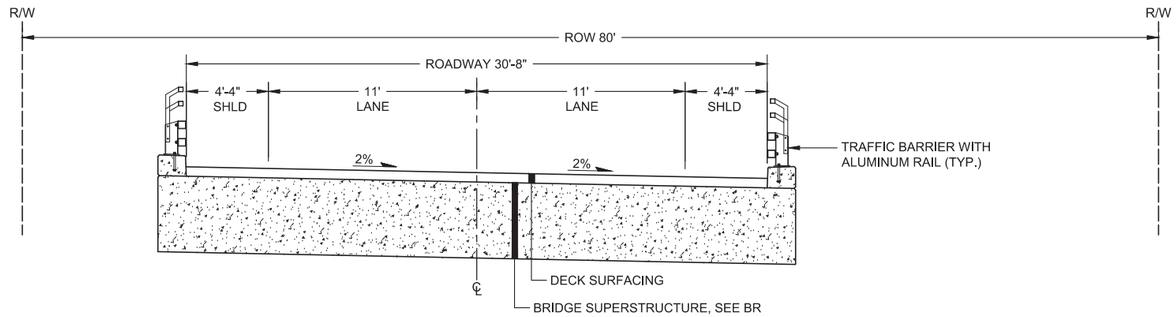


** NOTE: CROSS-SLOPE VARIES FROM -2.0% TO +2.0%

*** NOTE: WHERE REQUIRED TO MEET SUBGRADE, PLACE COMPACTED GRAVEL BORROW. SEE SPECIFICATIONS SECT. 2-03

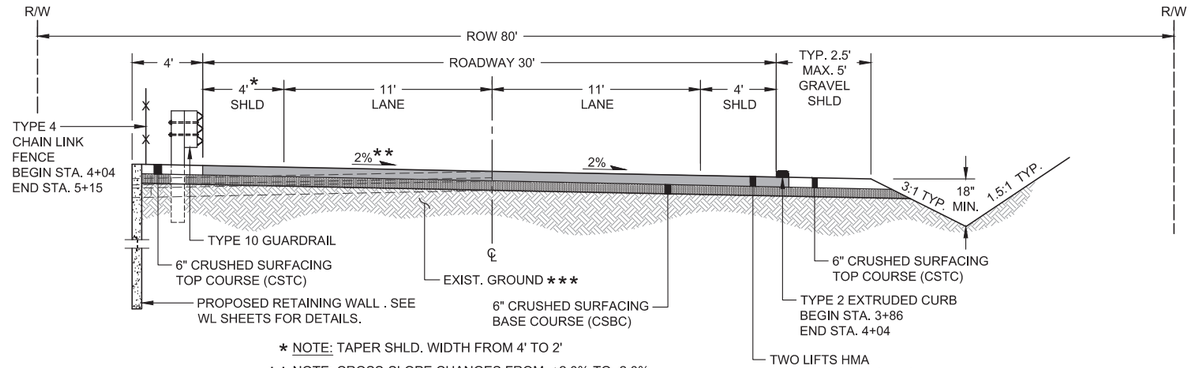
55TH AVE NE FROM STA 2+40 TO 2+85 (B / RD1.02)

SCALE: 1"=4'



55TH AVE NE FROM STA 2+85 TO 3+95 (C / RD1.02)

SCALE: 1"=4'



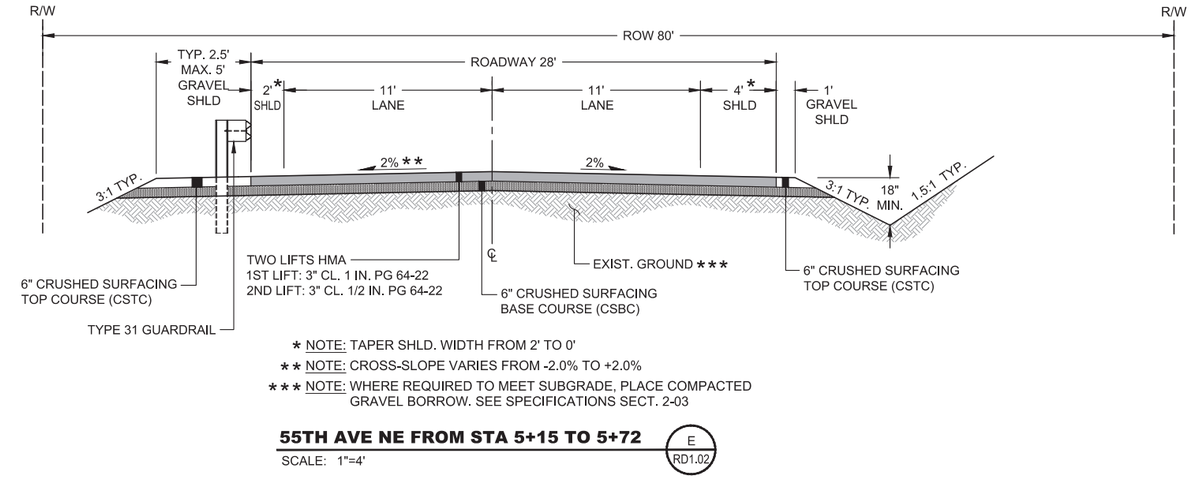
* NOTE: TAPER SHLD. WIDTH FROM 4' TO 2'

** NOTE: CROSS-SLOPE CHANGES FROM +2.0% TO -2.0%

*** NOTE: WHERE REQUIRED TO MEET SUBGRADE, PLACE COMPACTED GRAVEL BORROW. SEE SPECIFICATIONS SECT. 2-03

55TH AVE NE FROM STA 3+95 TO 5+15 (D / RD1.02)

SCALE: 1"=4'



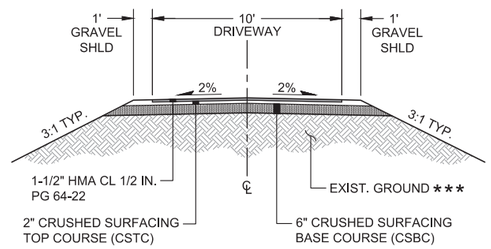
* NOTE: TAPER SHLD. WIDTH FROM 2' TO 0'

** NOTE: CROSS-SLOPE VARIES FROM -2.0% TO +2.0%

*** NOTE: WHERE REQUIRED TO MEET SUBGRADE, PLACE COMPACTED GRAVEL BORROW. SEE SPECIFICATIONS SECT. 2-03

55TH AVE NE FROM STA 5+15 TO 5+72 (E / RD1.02)

SCALE: 1"=4'



*** NOTE: WHERE REQUIRED TO MEET SUBGRADE, PLACE COMPACTED GRAVEL BORROW. SEE SPECIFICATIONS SECT. 2-03

DRIVEWAY-2 FROM STA 2+00 TO 2+43 (F / RD1.03)

SCALE: 1"=4'

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HERRERA

THOMAS M. WELLER STATE OF WASHINGTON 36669 REGISTERED PROFESSIONAL ENGINEER
2/3/2020

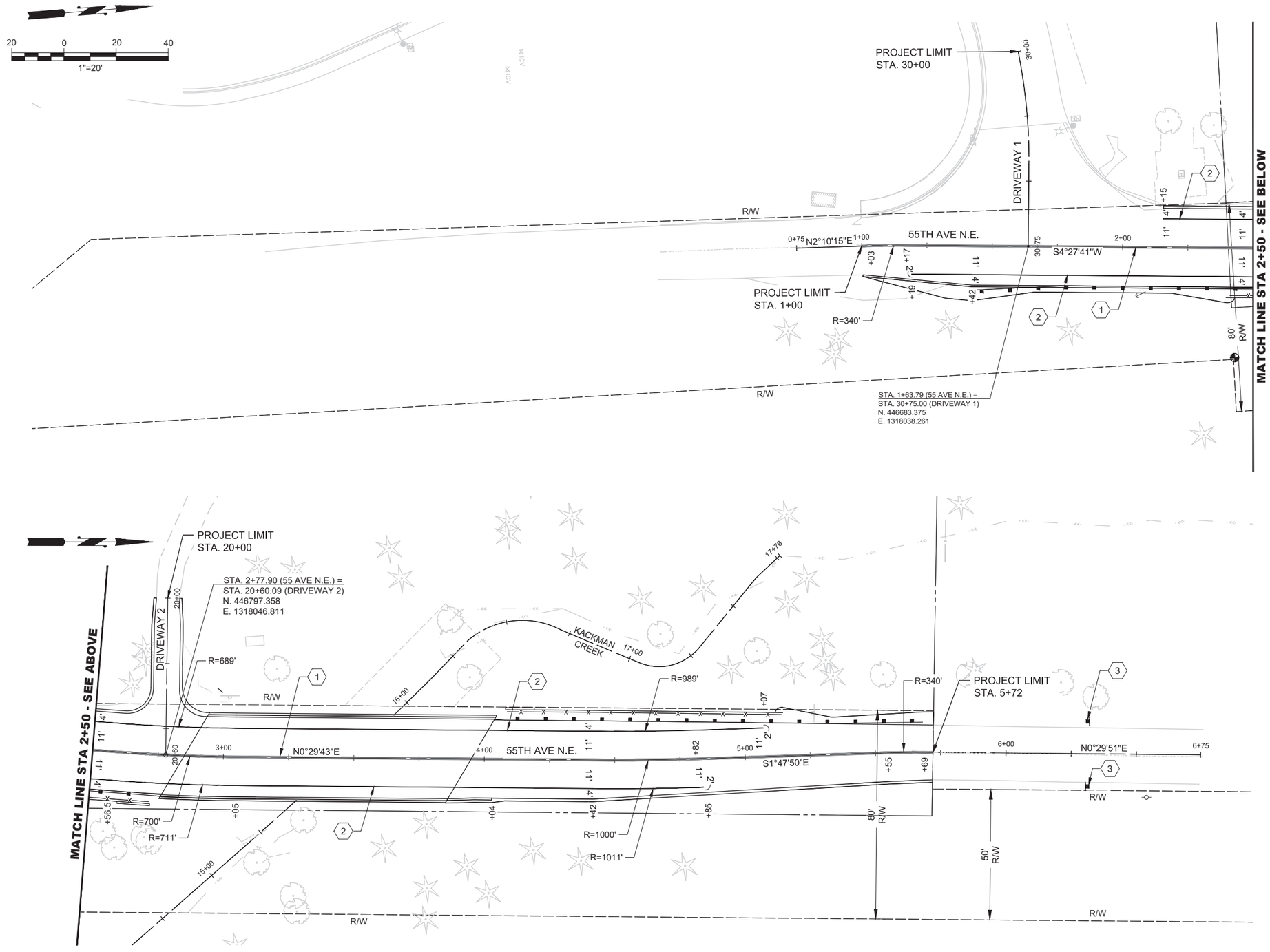
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DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

TYPICAL ROADWAY SECTIONS

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: RD2.01
SHEET NO: 17 OF 61

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GENERAL NOTES:

1. SEE DRAWING G1.01 FOR ABBREVIATIONS AND LEGEND.

(#) CONSTRUCTION NOTES:

1. PAINTED YELLOW DOUBLE CENTERLINE PER WSDOT STD PLAN M-20.10.
2. PLASTIC WHITE SOLID EDGE LINE PER WSDOT STD PLAN M-20.10.
3. INSTALL SIGNAGE PER WSDOT STD. PLAN K-80.10.

STREET SIGN SCHEDULE

TYPE	DESCRIPTION	STATION & OFFSET	QTY.
R2-1	SPEED LIMIT 25 MPH	STA. 6+31, 12.5' LT	1
R2-1	SPEED LIMIT 35 MPH	STA. 6+31, 12.5' RT	1

ORIGINATED BY: / DATE:
CHECKED BY: / DATE:
BACK-CHECKED BY: / DATE:
CORRECTED BY: / DATE:
VERIFIED BY: / DATE:
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stulǝgʷa'bš
VILLAGE

HERRERA

THOMAS M. WELLER
STATE OF WASHINGTON
36609
REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: T. WELLER	DRAWN: M. SCHAEFER
DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

ROADWAY STRIPING AND SIGNAGE PLAN

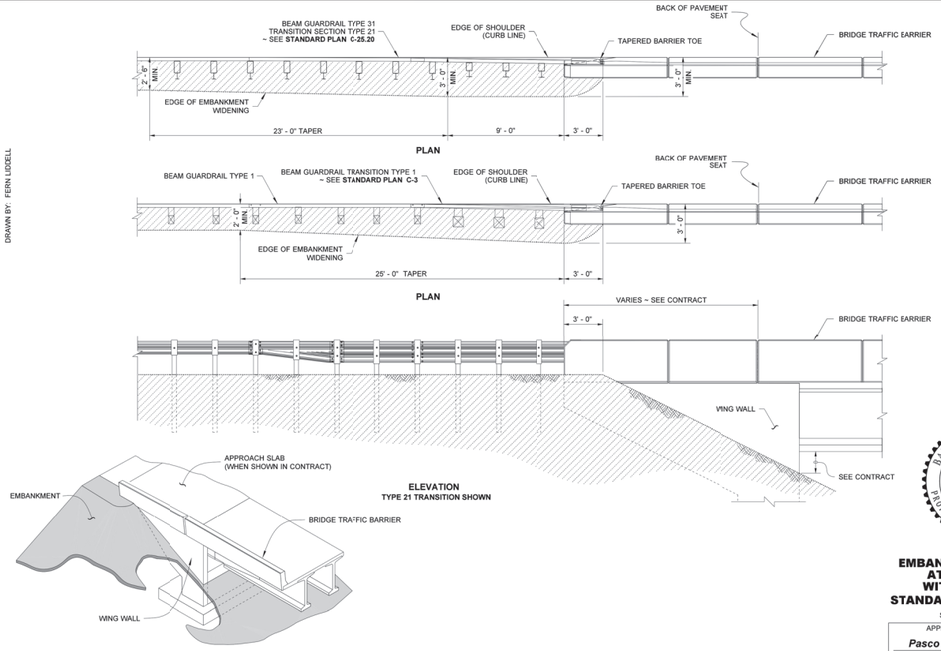
DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	RD3.01
SHEET NO:	18 OF 61

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DRAWN BY: FERN LIDDELL



BEAM GUARDRAIL CONNECTION TO BRIDGE TRAFFIC BARRIER



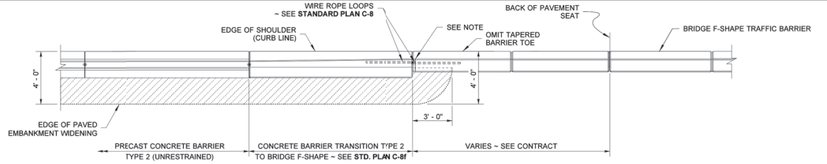
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EMBANKMENT WIDENING AT BRIDGE END WITH WING WALL
STANDARD PLAN A-50.10-00

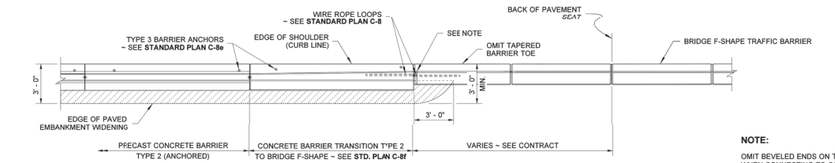
SHEET 1 OF 2 SHEETS

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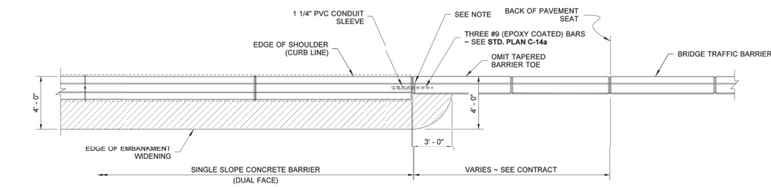


PLAN
WITH TYPE 2 UNRESTRAINED BARRIER



PLAN
WITH ANCHORED BARRIER

NOTE:
OMIT BEVELED ENDS ON TOP OF BRIDGE TRAFFIC BARRIER WHEN CONNECTING TO CONCRETE BARRIERS



PLAN
WITH SINGLE SLOPE BARRIER

CONCRETE BARRIER CONNECTION TO BRIDGE TRAFFIC BARRIER



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EMBANKMENT WIDENING FOR BRIDGE END WITH WING WALL
STANDARD PLAN A-50.10-00

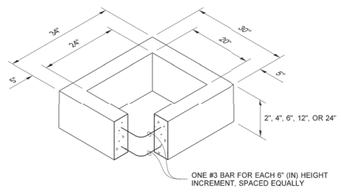
SHEET 2 OF 2 SHEETS

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Pasco Bakotich III 11-17-08
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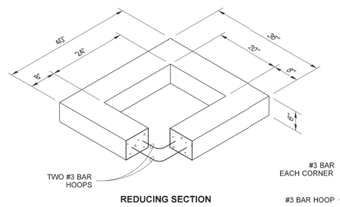
DRAWN BY: LISA CYFORD



FRAME AND VANED GRATE



RECTANGULAR ADJUSTMENT SECTION



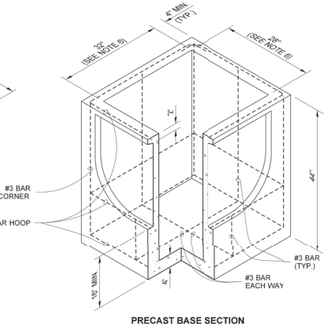
REDUCING SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	**MAXIMUM INSIDE DIAMETER (INCHES)**
REINFORCED OR PLAIN CONCRETE	18"
ALL METAL PIPE	21"
CPSSP ★ **(STD. SPEC. SECT. 9-05.20)**	18"
SOLID WALL PVC **(STD. SPEC. SECT. 9-05.12(1))**	21"
PROFILE WALL PVC **(STD. SPEC. SECT. 9-05.12(2))**	21"

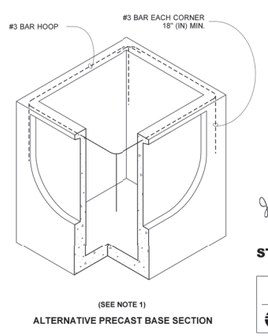
★ CORRUGATED POLYETHYLENE STORM SEWER PIPE

NOTES

1. As acceptable alternatives to the rebar shown in the **PRECAST BASE SECTION**, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot, shall be used with the minimum required rebar shown in the ALTERNATIVE **PRECAST BASE SECTION**. Wire mesh shall not be placed in the knockouts.
2. The knockout shall not be greater than 26" (in), in any direction. Knockouts shall have a wall thickness of 2" (in) minimum to 2.5" (in) maximum. Provide a 1.5" (in) minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with **Standard Specification Section 9-04.3**.
3. The maximum depth from the finished grade to the lowest pipe invert shall be 5' (ft).
4. The frame and grate may be installed with the flange down or integrally cast into the adjustment section with flange up.
5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1 : 24 or steeper.
6. The opening shall be measured at the top of the Precast Base Secion.
7. All pickup holes shall be grouted full after the basin has been placed.



PRECAST BASE SECTION



ALTERNATIVE PRECAST BASE SECTION
(SEE NOTE 1)



CATCH BASIN TYPE 1L

STANDARD PLAN B-5.40-02

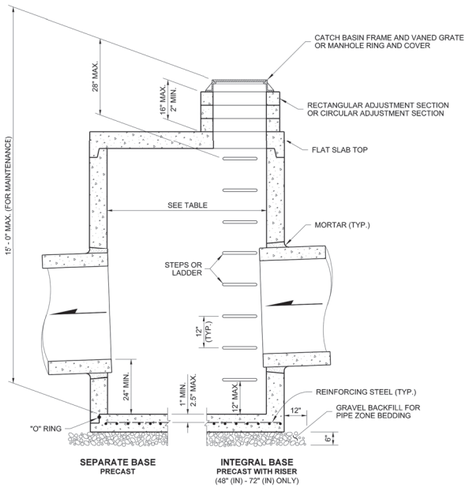
SHEET 1 OF 1 SHEET

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Carpenter, Jeff
Jan 26 2017 6:49 AM
cosign
STATE DESIGN ENGINEER
Washington State Department of Transportation

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NOTES

1. No steps are required when height is 4' or less.
2. The bottom of the precast catch basin may be sloped to facilitate cleaning.
3. The rectangular frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.
4. Knockouts shall have a wall thickness of 2" (in) minimum to 2.5" (in) maximum. Provide a 1.5" (in) minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with **Standard Specification Section 9-04.3.**



CATCH BASIN DIMENSIONS				
CATCH BASIN DIAMETER	**MIN. WALL THICKNESS**	**MIN. BASE THICKNESS**	**MAXIMUM KNOCKOUT SIZE**	**MINIMUM DISTANCE BETWEEN KNOCKOUTS**
48"	4"	6"	36"	8"
54"	4.5"	8"	42"	8"
60"	5"	8"	48"	8"
72"	6"	8"	60"	12"
84"	8"	12"	72"	12"
96"	8"	12"	84"	12"
120"	10"	12"	96"	12"
144"	12"	12"	108"	12"

PIPE ALLOWANCES					
CATCH BASIN DIAMETER	**PIPE MATERIAL WITH MAXIMUM INSIDE DIAMETER**				
	CONCRETE	**ALL METAL**	**CPSSP ① PP ④**	**SOLID WALL PVC ②**	**PROFILE WALL PVC ③**
48"	24"	30"	24"	30"	30"
54"	30"	36"	30"	36"	36"
60"	36"	42"	36"	42"	42"
72"	42"	54"	42"	48"	48"
84"	54"	60"	54"	48"	48"
96"	60"	72"	60"	48"	48"
120"	66"	84"	60"	48"	48"
144"	78"	96"	60"	48"	48"

① Corrugated Polyethylene Storm Sewer Pipe (See **Standard Specification Section 9-05.20**)
② (See **Standard Specification Section 9-05.12(1)**)
③ (See **Standard Specification Section 9-05.12(2)**)
④ Polypropylene Pipe (See **Standard Specification Section 9-05.24**)



CATCH BASIN TYPE 2

STANDARD PLAN B-10.20-02

SHEET 1 OF 1 SHEET

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Mar 2 2018 10:01 AM
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Z:\2017\2017019 - Stillguamish Kackman Creek Culverts\000 CAD\010 Drawing\B-Civil Sheet\2017019_ST.dwg | 1/24/2020 5:03 PM | Raman Brar

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No.	REVISION	BY	APP'D	DATE

ONE INCH
AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

STILLAGUAMISH
stulǝgʷa'bš
VILLAGE

HERRERA

THOMAS M. WELLER
STATE OF WASHINGTON
36669
REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: T. WELLER	DRAWN: M. SCHAEFER
DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: N/A	APPROVED: C. AVOLIO

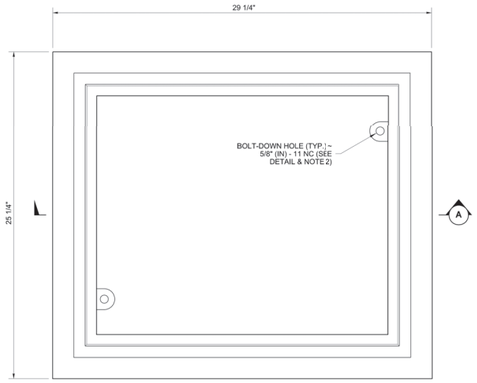
KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

ROADWAY STANDARD DETAILS 1

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	RD4.01
SHEET NO:	19 OF 61

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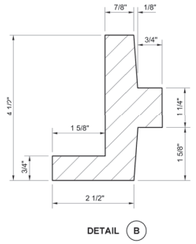
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TOP



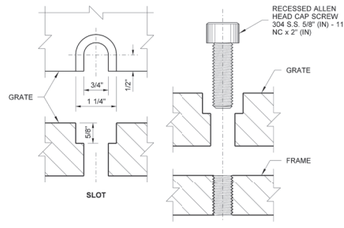
SECTION (A)



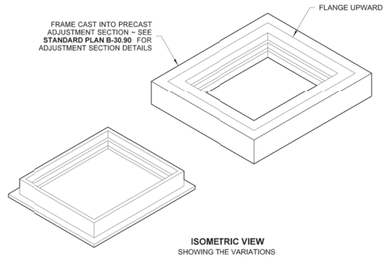
DETAIL (B)

NOTES

1. This frame is designed to accommodate 20" (in) × 24" (in) grates or covers as shown on **Standard Plans B-30.20, B-30.30, B-30.40,** and **B-30.50.**
2. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
3. Refer to **Standard Specification Section 9-05.15** and **9-05.15(2)** for additional requirements.



BOLT-DOWN DETAILS
SEE NOTE 2



ISOMETRIC VIEW
SHOWING THE VARIATIONS

JULIE HEILMAN STATE OF WASHINGTON 21810 REGISTERED PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:52 PM

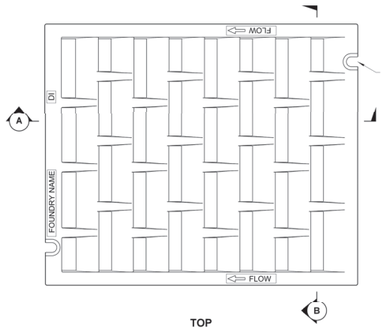
RECTANGULAR FRAME (REVERSIBLE)

STANDARD PLAN B-30.10-03

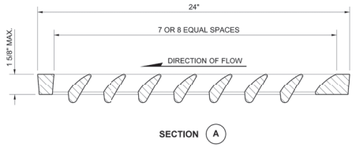
SHEET 1 OF 1 SHEET

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Carpenter, Jeff
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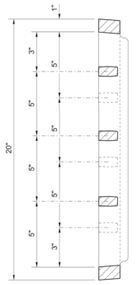
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TOP



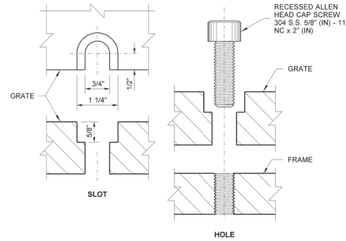
SECTION (A)



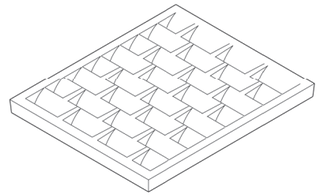
SECTION (B)

NOTES

1. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
2. Refer to **Standard Specification Section 9-05.15** and **9-05.15(2)** for additional requirements.
3. For frame details, see **Standard Plan B-30.10**.



BOLT-DOWN DETAILS
SEE NOTE 1



ISOMETRIC

JULIE HEILMAN STATE OF WASHINGTON 21810 REGISTERED PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:54 PM

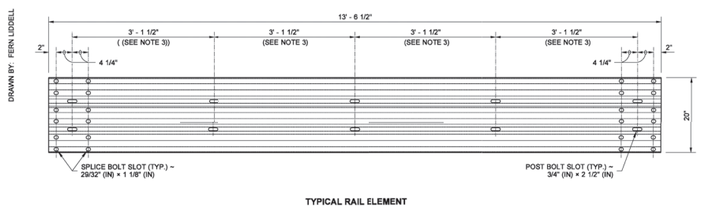
RECTANGULAR VANED GRATE

STANDARD PLAN B-30.30-03

SHEET 1 OF 1 SHEET

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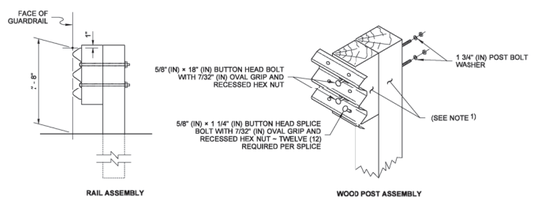
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TYPICAL RAIL ELEMENT

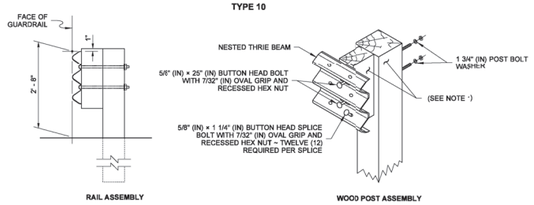
NOTES

1. Type 10 post shall be 6 × 8 timber, OR either W6 × 9, or W6 × 8.5 steel. Type 11 post shall be 10 × 10 timber or W6 × 15. For additional details see **Standard Plan C-1b.**
2. Type 10 guardrail post spacing shall be 6' - 3" on center. Type 11 shall be a maximum of 3' - 1 1/2" on center.
3. Spacing may vary depending on application. See **Standard Specification Section 9-16.3(1)** for rail element requirements.



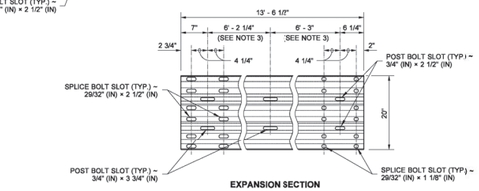
RAIL ASSEMBLY — WOOD POST ASSEMBLY

TYPE 10

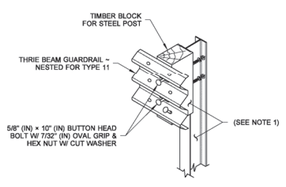


RAIL ASSEMBLY — WOOD POST ASSEMBLY

TYPE 11



EXPANSION SECTION



STEEL POST ASSEMBLY

TYPES 10 AND 11

EDWARD PATRICK BARRY STATE OF WASHINGTON 14363 REGISTERED PROFESSIONAL ENGINEER

Barry, Ed
Jul 14 2015 7:07 AM

BEAM GUARDRAIL (THRIE BEAM)

STANDARD PLAN C-1a

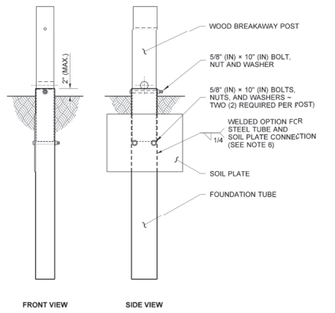
SHEET 1 OF 1 SHEET

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STATE DESIGN ENGINEER
Washington State Department of Transportation

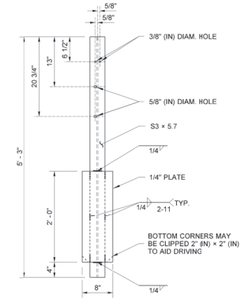
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NOTES

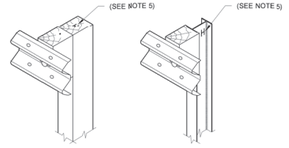
1. Wood posts for all guardrail placement plans shall be 6 × 8 except where noted otherwise.
2. Lower hole is for Rub Rail of Type 2 and Type 3 Beam Guardrail.
3. W6×8.5 or W6×9 steel posts and timber blocks are alternates for 6×8 timber posts and blocks. W6×15 steel posts and timber blocks are alternates for 10×10 timber posts and blocks.
4. Attach blockouts to steel posts using bolt holes on approaching traffic side of post web.
5. When "Beam Guardrail Type - __ Ft. Long Post" is specified in the Contract, the post length shall be stamped with numbers, 1 1/2" (in) min. high and 3/4" (in) wide at the location where the letter "H" is shown in the ASSEMBLY DETAIL. For wood post applications, the letter shall be stamped to a minimum depth of 1/4" (in). For steel post applications, the letter shall be legible after the post is galvanized. After post installation, it shall be the Contractor's responsibility to ensure the stamped numbers remain visible.
6. Soil plate may be welded to foundation tube. If so, holes in soil plate and foundation tube may be omitted.



ANCHOR POST ASSEMBLY

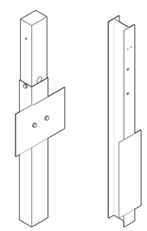


G-2 POST



TIMBER POST — STEEL POST

PARTIAL ASSEMBLY DETAIL



ANCHOR POST — G-2 POST

ISOMETRIC

JOHN PATRICK DONAHUE STATE OF WASHINGTON 29023 REGISTERED PROFESSIONAL ENGINEER

Donahue, John
Aug 10 2019 1:28 PM

BEAM GUARDRAIL POSTS AND BLOCKS

STANDARD PLAN C-1b

SHEET 1 OF 2 SHEETS

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Rauk, Steve
Aug 12 2019 9:54 AM
STATE DESIGN ENGINEER
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\\BHM-SRVR-01\Bellingham Projects\2017\2017019 - Stillaguamish Kackman Creek Culverts\000 CAD\010 Drawing\B-Civil Sheet\20171019_ST.dwg | 1/24/2020 4:30 PM | Michael Schaefer

100% DESIGN - BID SET

No.	REVISION	BY	APP'D	DATE

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

STILLAGUAMISH stuləgʷaʔbš VILLAGE

HERRERA

THOMAS M. WELLER STATE OF WASHINGTON 36666 REGISTERED PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: T. WELLER	DRAWN: M. SCHAEFER		
DESIGNED: R. BRAR	DRAWN: C. HEARING		
DESIGNED:	CHECKED: K. NIKZAD		
SCALE: N/A	APPROVED: C. AVOLIO		

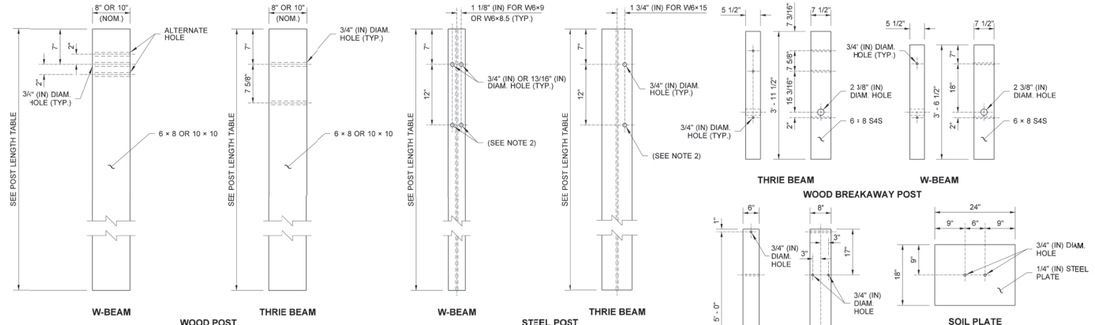
KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

ROADWAY STANDARD DETAILS 2

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	RD4.02
SHEET NO:	OF 20 61

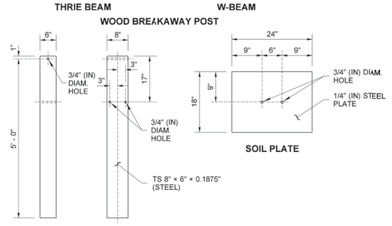
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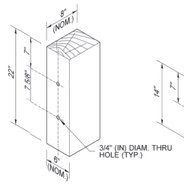
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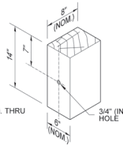
POST LENGTH TABLE	
GUARDRAIL TYPE	LENGTH
1 through 4 & 31	6' - 0" ★
10 or 11	6' - 6"

★ SEE CONTRACT FOR "BEAM GUARDRAIL TYPE - __ FT. LONG POST" LENGTHS. (SEE NOTE 5)

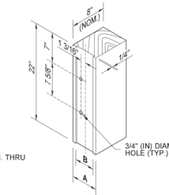




THRIE BEAM WOOD BLOCK FOR WOOD POST



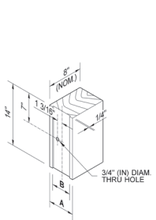
W-BEAM WOOD BLOCK FOR WOOD POST



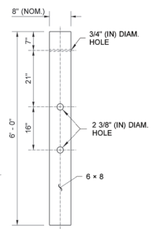
THRIE BEAM WOOD BLOCK FOR STEEL POST

POST	A	B
W6 × 8.5	8" ★★	6 1/4"
W6 × 15	8" ★★	6 1/4"
W6 × 9	6" ★★	4 1/4"

★★ NOMINAL (NOM.)



W-BEAM WOOD BLOCK FOR STEEL POST



CONTROLLED RELEASING TERMINAL (CRT) POST

JOHN PATRICK DONAHUE STATE OF WASHINGTON 39021 REGISTERED PROFESSIONAL ENGINEER

Donahue, John
Aug 10 2019 1:28 PM

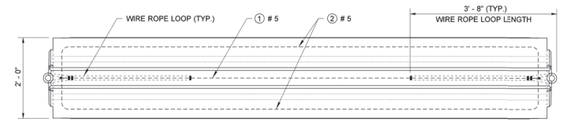
BEAM GUARDRAIL POSTS AND BLOCKS

STANDARD PLAN C-1b

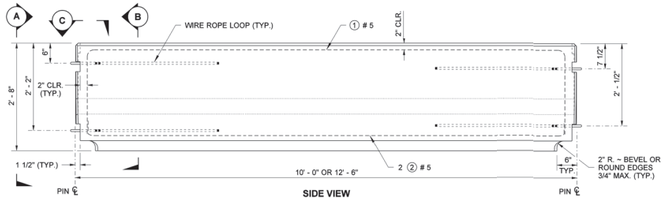
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Roark, Steve
Aug 12 2019 9:55 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: MARK SUJKA



TOP VIEW

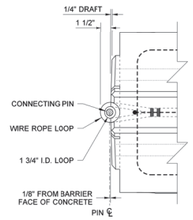


SIDE VIEW

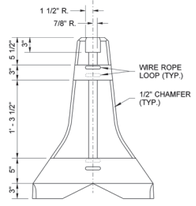
BARRIER SECTION

NOTES

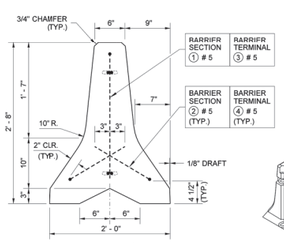
1. Wire rope loops shall be 3' - 8" long, except for the top loop of the Barrier Terminal, which shall be 2' - 0" long.
2. Except for the locations of the wire rope loops, the dimensions shown in END VIEW "A" are typical for both ends of a Barrier Section or opposing ends of Barrier Terminals.
3. Connecting and Drift Pin head designs vary among different manufacturers. Pin designs that are shaped differently than those shown in the detail are acceptable, if the bearing surface is within the minimum and maximum widths specified.
4. The vertical spacing of the Wire Rope Loops in a Barrier Terminal is determined by the end of the Barrier Segment to which it is being connected. See BARRIER CONNECTION DETAIL (Sheet 2).



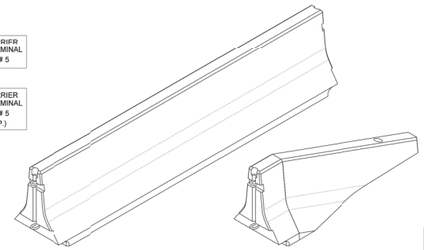
DETAIL C



END VIEW (A)



SECTION (B)



ISOMETRIC VIEWS

MICHAEL S. FLEMING STATE OF WASHINGTON 38777 REGISTERED PROFESSIONAL ENGINEER

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT UNLESS IT BEARS THE ORIGINAL SIGNATURE AND SEAL OF THE WASHINGTON STATE REGISTERED ENGINEER. IT IS PLACED THE RESPONSIBILITY AND LIABILITY FOR ITS USE AS A CONTRACT DOCUMENT OR FOR ANY OTHER PURPOSE.

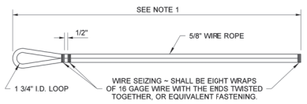
CONCRETE BARRIER TYPE 2

STANDARD PLAN C-8

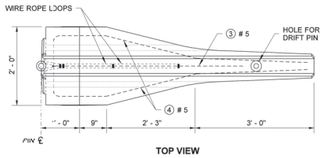
SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Pasco Bakotich III *02-10-09*
STATE DESIGN ENGINEER DATE
Washington State Department of Transportation

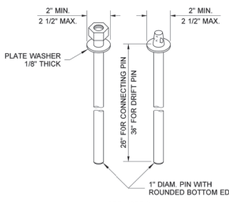
DRAWN BY: MARK SUJKA



WIRE ROPE LOOP DETAIL

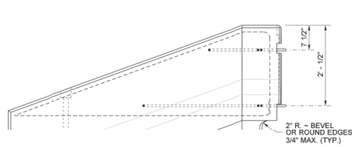


TOP VIEW

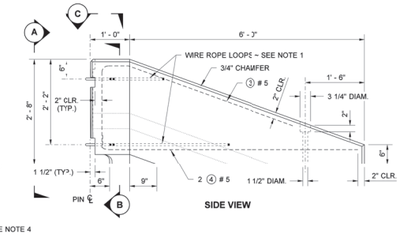


SEE NOTE 3

CONNECTING PINS AND DRIFT PINS



SIDE VIEW

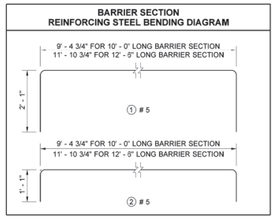


SIDE VIEW

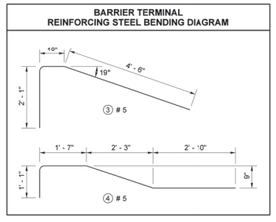
SEE NOTE 4

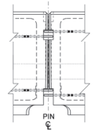
BARRIER TERMINAL

BARRIER SECTION REINFORCING STEEL BENDING DIAGRAM



BARRIER TERMINAL REINFORCING STEEL BENDING DIAGRAM





BARRIER CONNECTION DETAIL

MICHAEL S. FLEMING STATE OF WASHINGTON 38777 REGISTERED PROFESSIONAL ENGINEER

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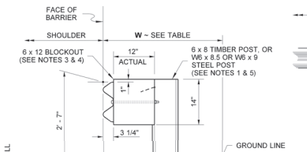
CONCRETE BARRIER TYPE 2

STANDARD PLAN C-8

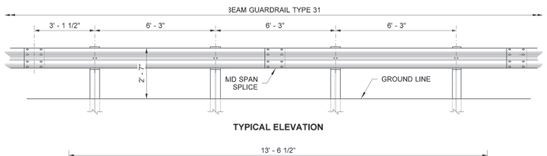
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Pasco Bakotich III *02-10-09*
STATE DESIGN ENGINEER DATE
Washington State Department of Transportation

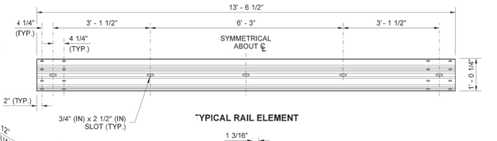
DRAWN BY: FERN LIDDELL



TYPICAL SECTION ~ WITHOUT CURB
(6' - 0" POSTS)



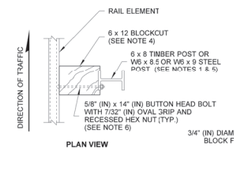
TYPICAL ELEVATION



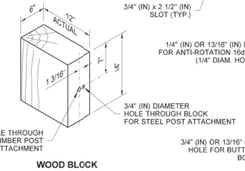
TYPICAL RAIL ELEMENT

NOTES

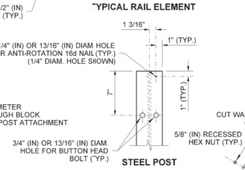
1. Refer to **Standard Plan C-1t** and **C-20.11** for additional details not shown on this plan.
2. Extend shoulder pavement to provide a base for the extruded curb. See Contract Plans for exceptions to distances shown.
3. Use a single block or combination of blocks (no more than two (2) to achieve the actual 12" (in) offset. See **Standard Specification**, **Section 9-16.3(2)**. Wood blocks shall be secured to the posts with anti-rotation nails. If combination blocks are used, the adjacent blocks shall be toenailed with two 16d galvanizec nails to prevent block rotation.
4. Wood blocks are shown. Blocks of an approved alternative material may be used. See **Standard Specification, Section 9-16.3(2).**
5. All posts for any standard barrier run shall be of the same type: timber or steel.
6. Attach blockouts to steel posts using bolt holes on approaching traffic side of post web.



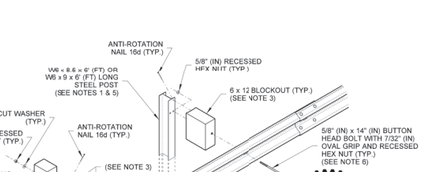
PLAN VIEW

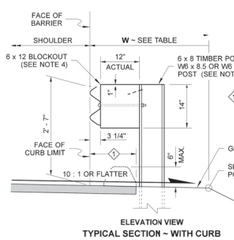


WOOD BLOCK



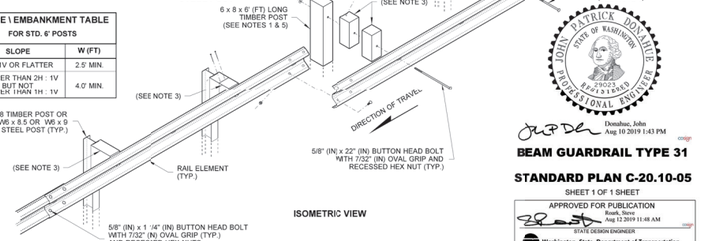
STEEL POST





ELEVATION VIEW
TYPICAL SECTION ~ WITH CURB
(6' - 0" LONC POSTS)

SLOPE \ EMBANKMENT TABLE FOR STD. 6' POSTS	
SLOPE	W (FT)
2H : 1V OR FLATTER	2.5' MIN.
STEEPER THAN 2H : 1V BUT NOT STEEPER THAN 1H : 1V	4.0' MIN.



ISOMETRIC VIEW

JOHN PATRICK DONAHUE STATE OF WASHINGTON 39021 REGISTERED PROFESSIONAL ENGINEER

Donahue, John
Aug 10 2019 1:43 PM

BEAM GUARDRAIL TYPE 31

STANDARD PLAN C-20.10-05

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Roark, Steve
Aug 12 2019 11:48 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

811 Know what's **below.** **Call** before you dig.

ORIGINATED BY: / DATE:
CHECKED BY: / DATE:
BACK-CHECKED BY: / DATE:
CORRECTED BY: / DATE:
VERIFIED BY: / DATE:

\\BHM-SRVR-01\Bellingham Projects\2017\201701 9 - Stillaguamish Kackman Creek Culverts\000 CAD\010 Drawing\B-Civil Sheet\201701 9_ST.dwg | 1/24/2020 4:29 PM | Michael Schaefer

No.	REVISION	BY	APP'D	DATE

100% DESIGN - BID SET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

STILLAGUAMISH stulǝgʷaʼbš VILLAGE

HERRERA

THOMAS M. WELLER STATE OF WASHINGTON 46669 REGISTERED PROFESSIONAL ENGINEER
2/3/2020

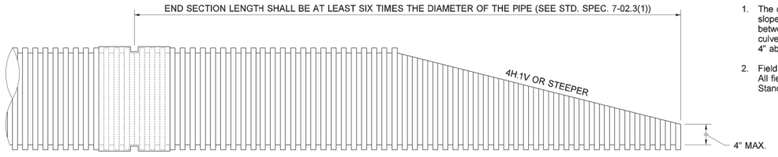
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DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: N/A	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

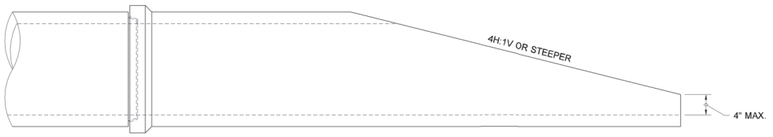
ROADWAY STANDARD DETAILS 3

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	RD4.03
SHEET NO:	21 OF 61

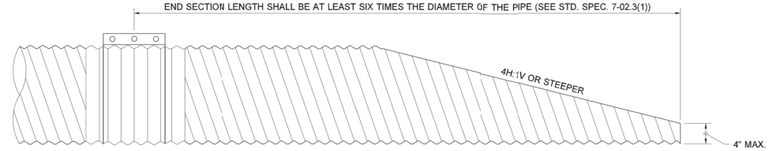
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THERMOPLASTIC PIPE



CONCRETE PIPE



METAL PIPE

NOTES

1. The culvert ends shall be beveled to match the embankment or ditch slope and shall not be beveled flatter than 4H:1V. When slopes are between 4H:1V and 6H:1V, shape the slope in the vicinity of the culvert end to ensure that no part of the culvert protrudes more than 4" above the ground line.
2. Field cutting of culvert ends is permitted when approved by the Engineer. All field-cut culvert pipe shall be treated with treatment as shown in the Standard Specifications or General Special Provisions.

FOR CULVERTS 30" DIAMETER OR LESS

MATTHEW J. WITTICH — STATE OF WASHINGTON — 15588 — REGISTERED PROFESSIONAL ENGINEER

EXPIRES JULY 1, 2007

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BEVELED END SECTIONS

STANDARD PLAN B-70.20-00

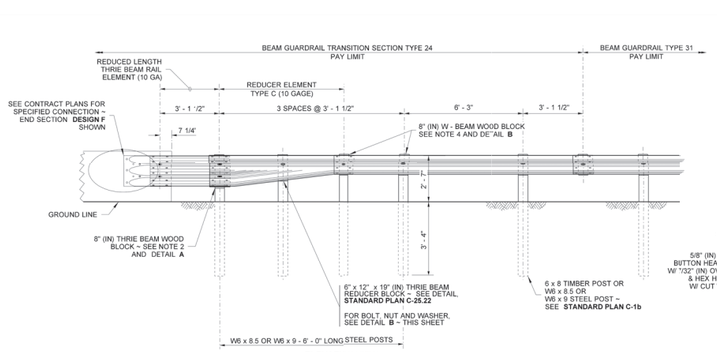
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Harold J. Peterfeso 06-01-06

STATE DESIGN ENGINEER — DATE

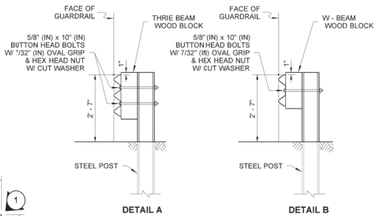
Washington State Department of Transportation

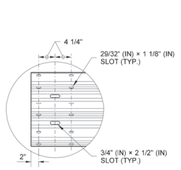


ELEVATION VIEW

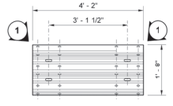
NOTES

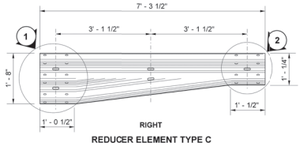
1. This guardrail transition is for connection to a vertical concrete shape, a single slope, or a safety-shape barrier. The toe of the single slope and the safety-shape barrier shall be tapered or the barrier blocked out so that the toe of the barrier does not project beyond the face of the approach guardrail.
2. See **Standard Plan C-1b** for thrie beam wood block detail.
3. See **Standard Plan C-20.10** for typical components (nuts,washers and bolts) at splices.
4. See **Standard Plan C-1b** for W-Beam wood block detail.
5. All rail sections shall be lapped in the direction of traffic.
6. See **Standard Plan C-24.10** for details regarding connection to bridge rail or traffic barrier.

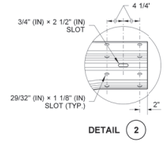












JEFFERY K. PETTERSON — STATE OF WASHINGTON — 36937 — REGISTERED PROFESSIONAL ENGINEER

Peterson, Jeff (HQ Design)
Jun 26 2018 9:48 AM

BEAM GUARDRAIL (TYPE 31) TRANSITION SECTION TYPE 24 (POSTED SPEED 45 MPH AND BELOW) STANDARD PLAN C-25.30-00

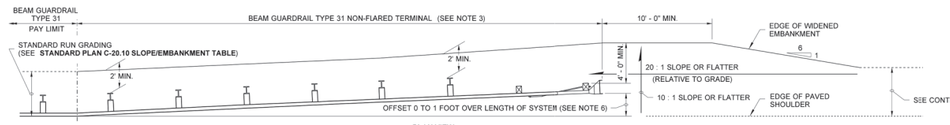
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

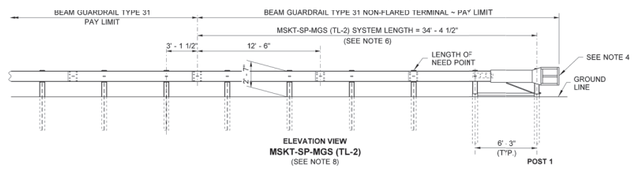
Carpenter, Jeff
Jun 28 2018 10:43 AM

STATE DESIGN ENGINEER

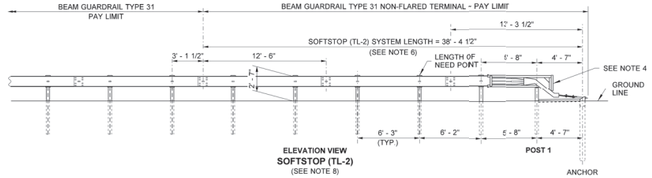
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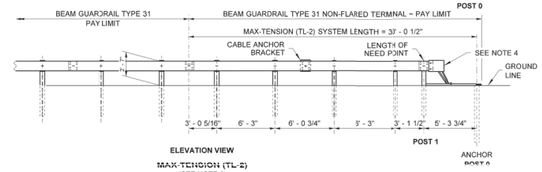
PLAN VIEW
(MSKT-SP-MGS (TL-2) SHOWN)



ELEVATION VIEW
MSKT-SP-MGS (TL-2)
(SEE NOTE 8)



ELEVATION VIEW
SOFTSTOP (TL-2)
(SEE NOTE 8)



ELEVATION VIEW
MAX-TENSION (TL-2)
(SEE NOTE 8)

NOTES

1. The implementation of the Manual for Assessment of Safety Hardware (MASH) criteria may result in the acceptance of guardrail terminal systems currently not shown on this plan. Non-Flared terminals shall be selected from the WSDOT Qualified Products List (QPL) or approved through the WSDOT Request for Approval of Materials (RAM) process.
2. This terminal is MASH compliant at Test Level Two (TL-2) and may be used in applications with posted speed of 45 mph or less.
3. An MSKT-SP-MGS (TL-2) as manufactured by Road Systems, Inc, SOFTSTOP (TL-2) as manufactured by Trinity Highway Products, LLC, or MAX-TENSICN (TL-2) as manufactured by Lindsay Transportation Solutions, shall be installed according to manufacturer's recommendations.
4. A reflectorized object marker shall be installed according to manufacturer's recommendations.
5. Snow load rail washers shall not be installed within the terminal limits.
6. Provide an offset between 0 to 1 foot so that the impact head does not encroach onto the paved shoulder. The offset is provided over the length of the terminal system from the center of the last post splice to either: (1) The face of the impact head at its leading edge (MSKT-SP-MGS), or (2) The center of anchor **Post 0** (Softstop or Max-Tension). Provide the maximum offset where practicable.
7. For terminal details, see WSDOT approved manufacturer's drawings.
8. These terminals are supplied with steel posts only. They can be used with beam guardrail Type 31 runs, composed of steel or wood guardrail posts.

JOHN PATRICK DONAHUE — STATE OF WASHINGTON — 29023 — REGISTERED PROFESSIONAL ENGINEER

Donahue, John
Aug 10 2019 2:03 PM

BEAM GUARDRAIL TYPE 31 NON-FLARED TERMINAL (POSTED SPEED 45 MPH AND BELOW) STANDARD PLAN C-22.45-04

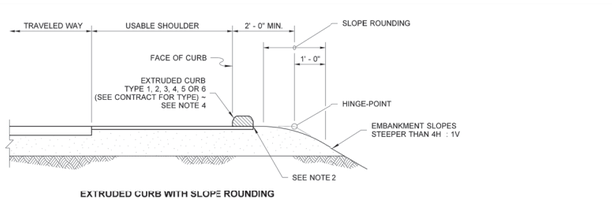
SHEET 1 OF 1 SHEET

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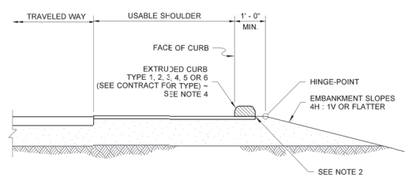
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STATE DESIGN ENGINEER

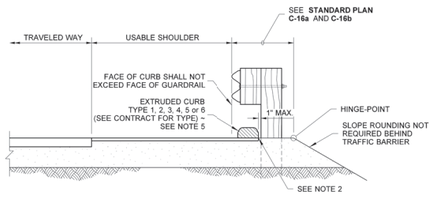
Washington State Department of Transportation



EXTRUDED CURB WITH SLOPE ROUNDING



EXTRUDED CURB WITHOUT SLOPE ROUNDING



EXTRUDED CURB AT BEAM GUARDRAIL

R. SCOTT ZELLER — STATE OF WASHINGTON — 22682 — REGISTERED PROFESSIONAL ENGINEER

Zeller, Scott
Jun 24 2016 7:18 AM

EXTRUDED CURB PLACEMENT

STANDARD PLAN F-10.40-03

SHEET 1 OF 1 SHEET

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Carpenter, Jeff
Jun 29 2016 2:27PM

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Washington State Department of Transportation

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VERIFIED BY: / DATE:
Z:\2017\2017019 - Stillaguamish Kackman Creek Culverts\000 CAD\010 Drawing\B-Civil Sheet\2017019_ST.dwg | 1/29/2020 10:16 AM | Michael Schaefer

100% DESIGN - BID SET

No.	REVISION	BY	APP'D	DATE

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STILLAGUAMISH stulǝgʷaʼbš VILLAGE

HERRERA

THOMAS M. WELLER — STATE OF WASHINGTON — 36600 — REGISTERED PROFESSIONAL ENGINEER

2/3/2020

DESIGNED: T. WELLER	DRAWN: M. SCHAEFER	SCALE: N/A	APPROVED: C. AVOLIO
DESIGNED: R. BRAR	DRAWN: C. HEARING		
DESIGNED:	CHECKED: K. NIKZAD		

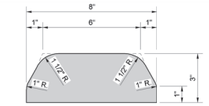
KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

ROADWAY STANDARD DETAILS 4

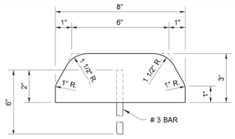
DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: RD4.04
SHEET NO: 22 OF 61

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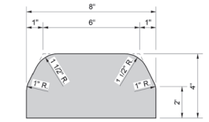
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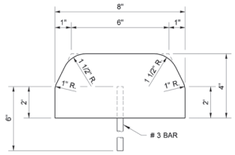
TYPE 1
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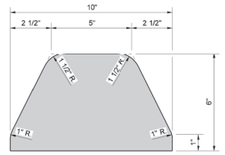
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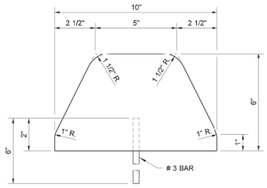
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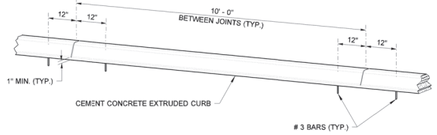
TYPE 5
(CEMENT CONCRETE)



TYPE 3
(HOT MIX ASPHALT)



TYPE 6
(CEMENT CONCRETE)



SPACING OF ANCHOR BARS
(FOR TYPES 4, 5, AND 6)

NOTE

JOINTS MAY BE FORMED DURING INSTALLATION USING A RIGID DIVIDER OR SAWCUT AFTER CONCRETE CURES TO MINIMUM STRENGTH.



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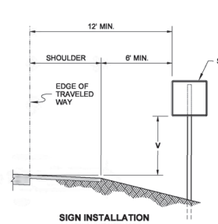
EXTRUDED CURB

STANDARD PLAN F-10.42-00

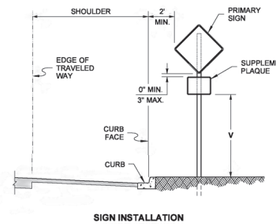
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Ken L. Smith 01-23-07
STATE DESIGN ENGINEER — DATE
Washington State Department of Transportation

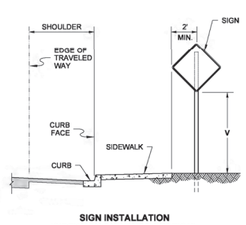
DRAWN BY: FERN LIDDELL



SIGN INSTALLATION
(FILL SECTION)



SIGN INSTALLATION
(CURB SECTION)

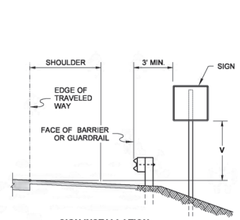


SIGN INSTALLATION
(SIDEWALK AND CURB SECTION)

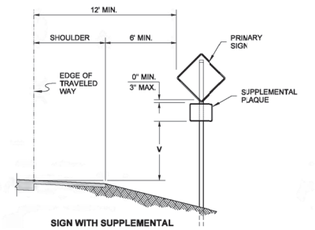
NOTES

1. For sign installation details, see **Standard Plan G - series.**
2. Where it is impractical to locate a sign with the lateral offset, a minimum of 2'(ft) offset may be used. A 1'(ft) lateral offset may be used in business, commercial or residential areas.
3. The "**V**" height for signs, with an area of more than 50 square feet and two or more sign **supports, is** 7 feet in both rural and urban areas.

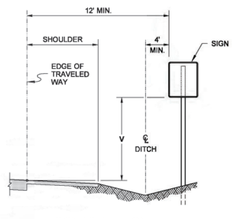
HEIGHT V		
	TO BOTTOM OF SIGN (NO SUPPLEMENTAL PLAQUE)	TO BOTTOM OF SJPPLEMENTAL PLAQUE (WHEN REQUIRED)
RURAL	5' MINIMUM	4' MINIMUM
URBAN	7' MINIMUM	6' MINIMUM



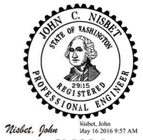
SIGN INSTALLATION
(BEHIND TRAFFIC BARRIER)



SIGN WITH SUPPLEMENTAL
PLAQUE INSTALLATION
(FILL SECTION)



SIGN INSTALLATION
(DITCH SECTION)



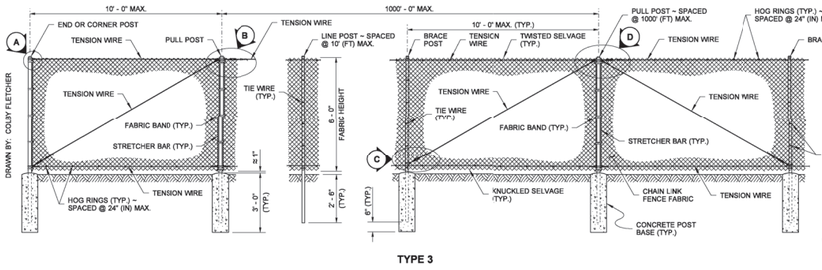
CLASS A CONSTRUCTION SIGNING INSTALLATION

STANDARD PLAN K-80.10-01

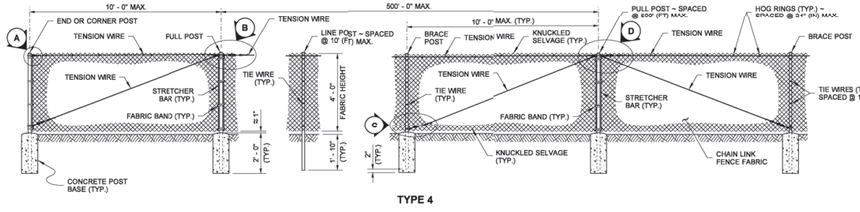
SHEET 1 OF 1 SHEET

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Carpenter, Jeff
Jan 1 2016 4:20 PM
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Washington State Department of Transportation

DRAWN BY: COLIN FLETCHER



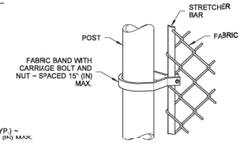
TYPE 3



TYPE 4

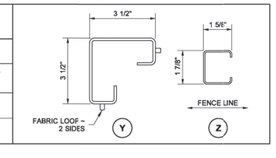
NOTES

1. All concrete post bases shall be 10" (in) minimum diameter.
2. Along the top and bottom, using Hog Rings, fasten the Chain Link Fence Fabric to the Tension Wire within the limits of the first full fabric weave.
3. Details are illustrative and shall not limit hardware design or post selection of any particular fence type.
4. Fencing shall be used for security and boundary delineation only.



METHOD OF FASTENING
STRETCHER BAR TO POST

POST AND RAIL SPECIFICATIONS			
POST	PIPE	ROLL FORMED	
	NOM. SIZE (SCH. 40) I.D.	SECTION	WEIGHT (lb/ft)
END, CORNER, OR PULL POST	2 1/2" DIAM.	Y	5.10
LINE OR BRACE POST	2" DIAM.	Z	1.85





Barry, Ed
Jul 14 2015 11:14 AM

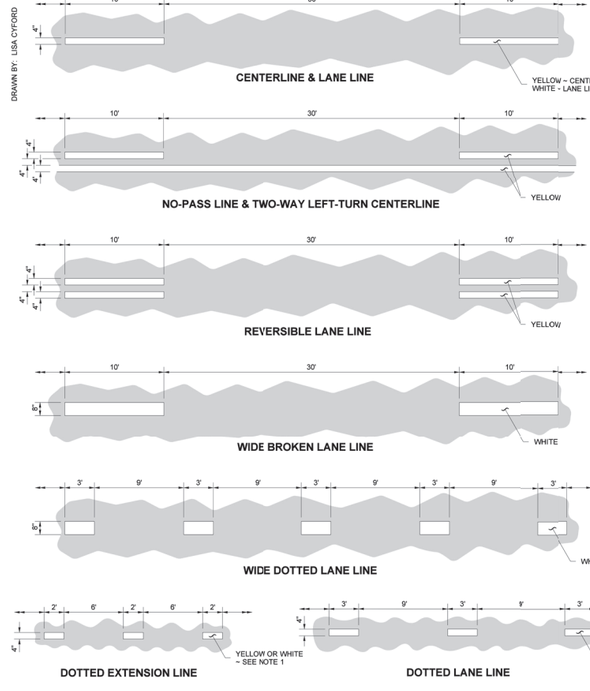
CHAIN LINK FENCE TYPES 3 AND 4

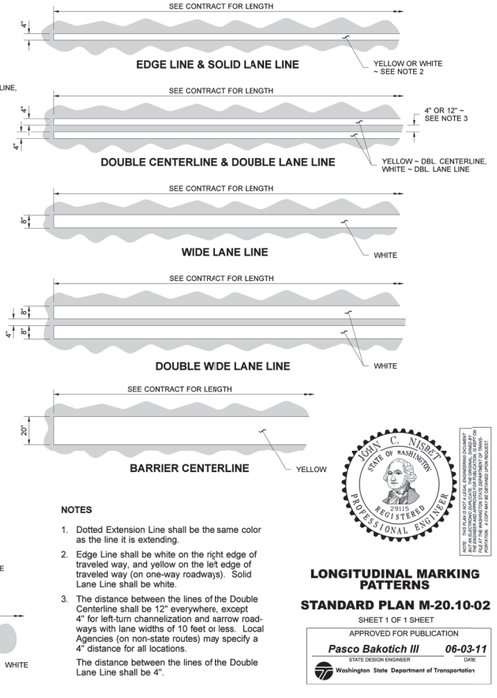
STANDARD PLAN L-20.10-03

SHEET 1 OF 2 SHEETS

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Carpenter, Jeff
Jul 14 2015 11:24 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: LISA CYFORD





NOTES

1. Dotted Extension Line shall be the same color as the line it is extending.
2. Edge Line shall be white on the right edge of traveled way, and yellow on the left edge of traveled way (on one-way roadways). Solid Lane Line shall be white.
3. The distance between the lines of the Double Centerline shall be 12" everywhere, except 4" for left-turn channelization and narrow road-ways with lane widths of 10 feet or less. Local Agencies (on non-state routes) may specify a 4" distance for all locations.

   The distance between the lines of the Double Lane Line shall be 4".

LONGITUDINAL MARKING PATTERNS

STANDARD PLAN M-20.10-02

SHEET 1 OF 1 SHEET

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Pasco Bakotich III 06-03-11
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\\BHM-SRVR-01\Bellingham Projects\2017\201701 9 - Stillaguamish Kackman Creek Culverts\000 CAD\010 Drawing\B-Civil Sheet\201701 9 _ST.dwg | 1/24/2020 4:29 PM | Michael Schaefer

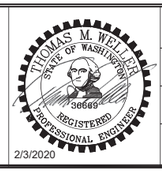
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No.	REVISION	BY	APP'D	DATE

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

STILLAGUAMISH
stulǝgʷa'bš
VILLAGE

HERRERA



2/3/2020

DESIGNED: T. WELLER	DRAWN: M. SCHAEFER
DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: N/A	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

ROADWAY STANDARD DETAILS 5

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	RD4.05
SHEET NO:	23 OF 61

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ACCESS POINT TYPES AND SPECIFICATIONS

USE	ROAD CLASSIFICATION	SECTION	STANDARD	STD. DWG	MINIMUM RADII (FT)	MINIMUM WIDTH (FT)	MAXIMUM WIDTH (FT)
RESIDENTIAL		CURB (URBAN)	DROP CURB DRIVEWAY	TABLE 2	N/A ②	TABLE 3	TABLE 3
		SHOULDER (RURAL)	RESIDENTIAL DRIVEWAY APPROACH: –ASPHALT	SD 2–030	10	TABLE 3	TABLE 3
			–CONCRETE	SD 2–035	10	TABLE 3	TABLE 3
COMMERCIAL OR INDUSTRIAL	ARTERIAL	CURB (URBAN)	DROP CURB DRIVEWAY	TABLE 2	N/A ②	35	40
		SHOULDER (RURAL)	COMMERCIAL/INDUSTRIAL APPROACH: –ASPHALT	SD 2–040	10	35	40
			–CONCRETE	SD 2–045	10	35	40
	NON ARTERIAL	CURB (URBAN)	DROP CURB DRIVEWAY	TABLE 2	N/A ②	25	40
		SHOULDER (RURAL)	COMMERCIAL/INDUSTRIAL APPROACH: –ASPHALT	SD 2–040	10	25	40
			–CONCRETE	SD 2–045	10	25	40

TABLE 2

STD. DWG. NO.	DROP CURB DRIVEWAY TYPE
SD 2–020	TYPE 1 – PLANTER STRIP WITH RAMPED DRIVEWAY
SD 2–022	TYPE 2 – PLANTER STRIP WITH RAMPED SIDEWALK
SD 2–024	TYPE 3 – NO PLANTER STRIP, RAMPED SIDEWALK TYPE 3R – NO PLANTER STRIP, REVERSE SLOPE

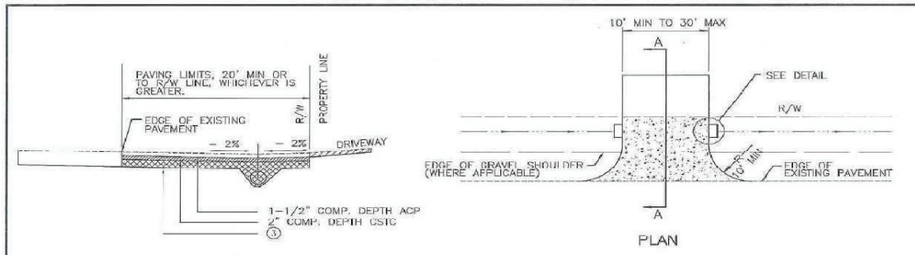
TABLE 3

ROAD NETWORK ELEMENT	MIN. WIDTH (FT) ④	MAX. WIDTH (FT)
PRIVATE ROAD	20	36
DRIVE AISLE	20	30
ALLEY	16	30
SHARED COURT	20	30
SHARED DRIVEWAY	10	30
DRIVEWAY	10	30

NOTES:

1. TABLE 1 SPECIFICATIONS APPLY TO ALL ROAD NETWORK ELEMENTS EXCEPT PUBLIC ROADS.
2. DROP CURB APPROACHES (TABLE 2) HAVE SIDE RAMPS IN LIEU OF RADII. SIDE RAMPS NOT PART OF A PEDESTRIAN ACCESS ROUTE SHALL NOT EXCEED 10% SLOPE MEASURED PARALLEL TO CURB LINE.
3. SEE EDDS 3–05 FOR ROAD NETWORK ELEMENT DESIGN DETAILS. SEE EDDS 2–03 FOR ONE–WAY ACCESS POINT WIDTHS AND URBAN CENTER ZONE SPECIFICATIONS.
4. FIRE LANE STATUS MAY CHANGE MINIMUM WIDTH, SEE EDDS 2–03.A AND 3–01.C.

SNOHOMISH COUNTY PUBLIC WORKS | APPROVED BY: | 11/7/13
2–010 | ACCESS POINT TYPES AND SPECIFICATIONS | COUNTY ROAD ENGINEER | DATE



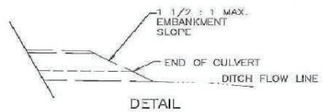
SECTION A–A

PLAN

NOTES:

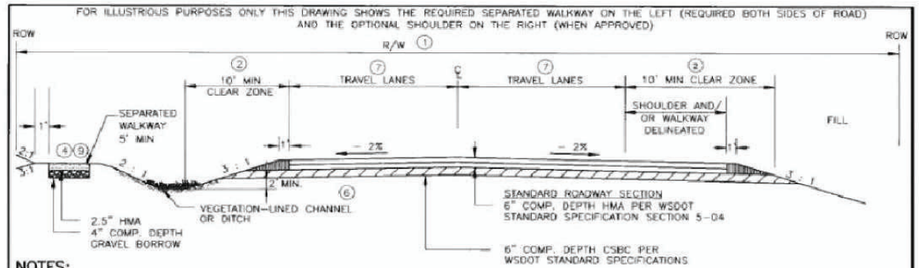
1. FOR DRIVEWAY OR SHARED DRIVEWAY ACCESS IN A RURAL SECTION, FIRE LANE SPECIFICATIONS MAY APPLY, SEE EDDS 2–03.A AND 3–01.C.
2. ALL SURFACE DRAINAGE FROM THE DRIVEWAY MUST BE CONTAINED AND DIRECTED FROM THE DRIVEWAY TO THE OPEN DITCH. NO SURFACE DRAINAGE SHALL FLOW ONTO THE COUNTY ROAD.
3. SUBGRADE SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH SECTION 2–03.3(14)C OF THE WSDOT/APWA SPECIFICATIONS (METHOD B). SURFACING MATERIALS SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY (MODIFIED PROCTOR).
4. CULVERT PIPE SHALL BE SIZED TO ACCOMMODATE DITCH FLOWS BUT IN NO CASE BE SMALLER THAN 12 INCHES. BEVEL CULVERT ENDS TO MATCH SIDESLOPES.
5. COVER DEPTHS LESS THAN 12 INCHES REQUIRE APPROVAL BY THE ENGINEER.
6. A DRIVEWAY CULVERT HEADWALL, SUBJECT TO APPROVAL BY THE ENGINEER, MAY BE USED IN LIEU OF THE 1 1/2: 1 MAX. SIDESLOPE.

SEE TEXT SECTION 2–03 & 5–05.L



DETAIL

SNOHOMISH COUNTY PUBLIC WORKS | APPROVED BY: | 11/7/13
2–030 | RESIDENTIAL DRIVEWAY APPROACH – ASPHALT | COUNTY ROAD ENGINEER | DATE



NOTES:

1. RIGHT OF WAY WIDTH WILL VARY DEPENDING ON LOCATION AND OWNERSHIP OF DRAINAGE AND PEDESTRIAN FACILITIES.
2. CLEAR ZONE DISTANCE FOR ROADS WITH A POSTED SPEED OF 35 MPH OR LESS SHALL BE 10 FT BEYOND EDGE OF TRAVELED WAY. CLEAR ZONE DISTANCES FOR ROADS POSTED AT GREATER THAN 35 MPH SHOULD BE DETERMINED ACCORDING TO CHAPTER 1600 OF THE WSDOT DESIGN MANUAL OR CHAPTER 9 OF THE WSDOT UTILITIES MANUAL, AS APPLICABLE. REFER TO EDDS SECTION 4–15.A(1) FOR MEASURING CLEAR ZONE DISTANCE.
3. CROSS–SECTION MAY BE ALTERED WHERE A STREAM OR WETLAND BORDERS THE ROAD.
4. A WALKWAY IS NOT REQUIRED FOR ACCESS ROADS SERVING 90 ADT OR LESS AND HAVING NO POTENTIAL FOR CONNECTIVITY.
5. IN FILL SECTIONS AND AROUND CUL–DE–SACS, THE ENGINEER MAY REQUIRE A THICKENED EDGE TO CONTROL EROSION. SEE STD. DWG 4–145.
6. SEE STD. DWG. 8–010 FOR PLACEMENT OF UTILITIES.
7. SEE STD. DWG 3–060 FOR ADDITIONAL SPECIFICATIONS.
8. INDUSTRIAL/COMMERCIAL ROADS SERVING SIGNIFICANT VOLUMES OF TRUCK TRAFFIC MAY REQUIRE ADDITIONAL WIDTH AND PAVEMENT DEPTH AS DETERMINED BY THE ENGINEER BASED ON DATA SUBMITTED BY THE DEVELOPER.
9. PREFERRED WALKWAY LOCATION WHERE R/W PERMITS. WHEN PLACED IN THIS LOCATION, A WIDENED SHOULDER FOR A WALKWAY WILL NOT BE REQUIRED.

SEE TEXT CHAPTER 3

SNOHOMISH COUNTY PUBLIC WORKS | APPROVED BY: Douglas M. McCormick | 8/6/18
3–040 | TYPICAL NON–ARTERIAL ROAD–RURAL AREAS | COUNTY ROAD ENGINEER | DATE

GENERAL R/W USE RESTORATION REQUIREMENTS

1. AT THE ENGINEER'S DISCRETION, PRIOR TO COMMENCING ANY CONSTRUCTION, PHOTOGRAPHS DEPICTING PRE–EXISTING ROADWAY CONDITIONS WILL BE REQUIRED EVERY 50 FEET IN PAVED AREAS OR ANY OTHER LOCATION AS SPECIFIED BY THE ENGINEER.
2. SIGNING, FLAGGING AND TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THESE STANDARDS, THE WSDOT TRAFFIC MANUAL AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
3. ONE LANE OF TRAFFIC SHALL REMAIN OPEN AT ALL TIMES, ATTENDED BY FLAGMEN AND APPROPRIATE CONSTRUCTION SIGNING PROVIDED. THE ROAD SHALL BE RESTORED TO TWO–WAY TRAFFIC AT THE END OF EACH WORKING DAY. APPLICATIONS FOR TOTAL ROAD CLOSURES MUST BE FILED WITH SNOHOMISH COUNTY PUBLIC WORKS AT LEAST 5 DAYS PRIOR TO THE ANTICIPATED CLOSURE.
4. EXISTING DRAINAGE DITCHES, CULVERTS, ETC., SHALL BE KEPT CLEAN AT ALL TIMES. TEMPORARY DIVERSION OF ANY DRAINAGE SYSTEM WILL NOT BE PERMITTED WITHOUT THE CONSENT OF THE ENGINEER. ANY DRAINAGE CULVERT, CATCHBASIN, MANHOLE OR OTHER DRAINAGE STRUCTURE DISTURBED BY EXCAVATION SHALL BE REPLACED WITH NEW MATERIAL OR REPAIRED TO THE SATISFACTION OF THE ENGINEER. TEMPORARY EROSION/SEDIMENTATION CONTROL MEASURES SHALL BE EMPLOYED TO PROTECT ADJACENT PROPERTY AND STORM DRAINAGE FACILITIES.
5. GRAVEL SHOULDERS DISTURBED BY EXCAVATION SHALL BE SHAPED TO COUNTY STANDARDS AND PROVIDED WITH A MINIMUM OF 6 INCHES COMPACTED CRUSHED SURFACING TOP COURSE.
6. IF IN THE OPINION OF THE ENGINEER, WEATHER CONDITIONS DETERIORATE TO THE POINT WHERE THE TRAVELED ROADWAYS ARE UNSAFE FOR THE PUBLIC OR DETRIMENTAL TO THE RESTORATION OF THE ROADWAY, EXCAVATION SHALL CEASE IMMEDIATELY AND CLEANUP SHALL BE PROMPTLY ACCOMPLISHED.
7. ALL PIPE OR OTHER MATERIAL STORED ALONG COUNTY RIGHT–OF–WAY MUST BE PLACED AT A SAFE DISTANCE FROM THE TRAVELED ROADWAY IN SUCH A MANNER AS TO AVOID FALLING ONTO THE ROADWAY.
8. NO EXCESS OR UNSUITABLE MATERIAL SHALL BE WASTED ON COUNTY RIGHT–OF–WAY. ANY SUCH MATERIAL DUMPED ON PRIVATE PROPERTY MAY REQUIRE A GRADING PERMIT. VERIFICATION WITH SNOHOMISH COUNTY PLANNING & DEVELOPMENT SERVICES IS REQUIRED.
9. STREET SURFACES SHALL BE CLEANED AT THE END OF EACH DAY'S OPERATION WITH A POWER BROOM OR OTHER APPROVED MEANS.
10. NO OPEN CUT CROSSING OF COUNTY ROADS OR STREETS SHALL BE MADE WITHOUT THE APPROVAL OF THE ENGINEER.
11. MAXIMUM AMOUNT OF OPEN TRENCH IN ROADS SHALL BE 400 LINEAL FEET. AT THE END OF EACH DAY, ALL DITCHES MUST BE BACKFILLED OR COVERED WITH STEEL PLATES AND BARRICADED WITH FLASHING WARNING LIGHTS TO PREVENT PEOPLE OR ANIMALS FROM FALLING INTO THE TRENCH.
12. FINAL CLEANUP INCLUDING COMPLETE RESTORATION OF SHOULDERS, CLEANING OF DITCHES, CULVERTS AND CATCHBASINS, AND REMOVAL OF LOOSE MATERIAL FROM BACK SLOPES OF DITCHES SHALL NOT EXCEED 1500 L.F. BEHIND EXCAVATING OPERATIONS OR AS REQUIRED BY THE ENGINEER.

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SNOHOMISH COUNTY PUBLIC WORKS | APPROVED BY: Steven E. Thompson | 2-10-03
8–010 | GENERAL R/W RESTORATION REQUIREMENTS | COUNTY ROAD ENGINEER | DATE

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STILLAGUAMISH stuləgʷaʔbš VILLAGE

HERRERA

THOMAS M. WELLER STATE OF WASHINGTON 36609 REGISTERED PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: T. WELLER	DRAWN: M. SCHAEFER
DESIGNED: R. BRAR	DRAWN: C. HEARING
DESIGNED:	CHECKED: K. NIKZAD
SCALE: N/A	APPROVED: C. AVOLIO

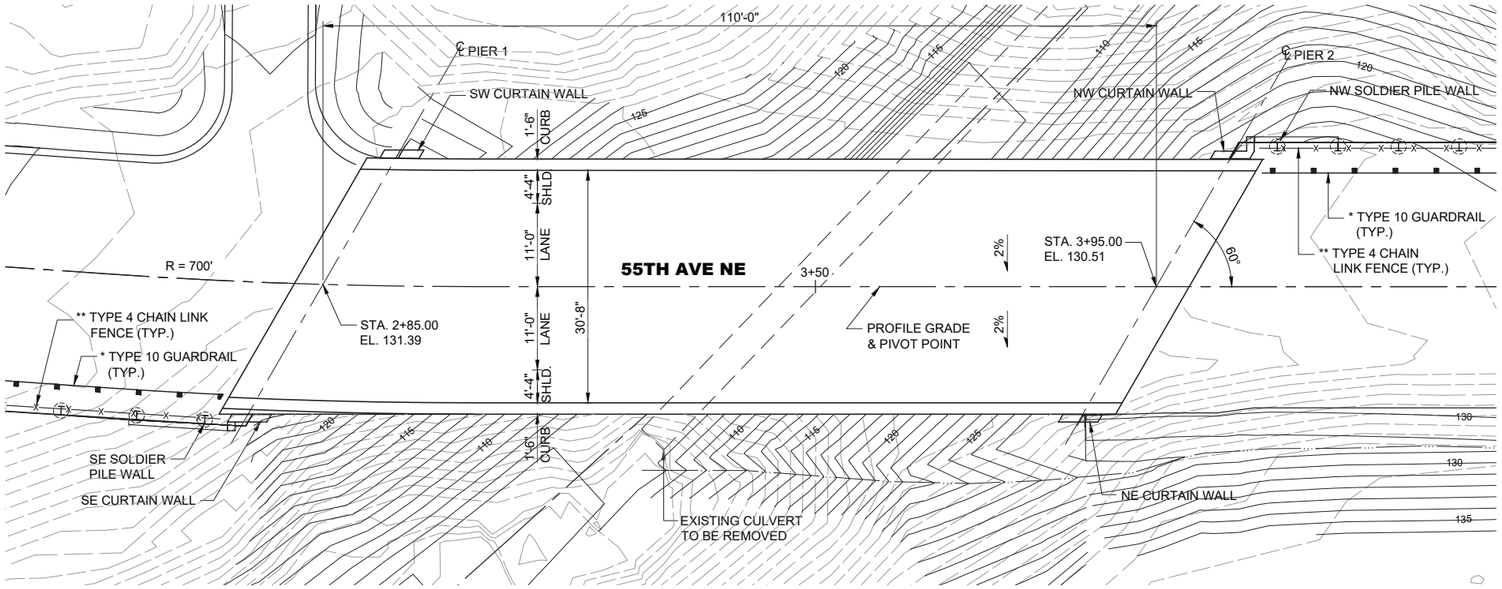
KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

ROADWAY STANDARD DETAILS 6

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: RD4.06
SHEET NO: 24 OF 61

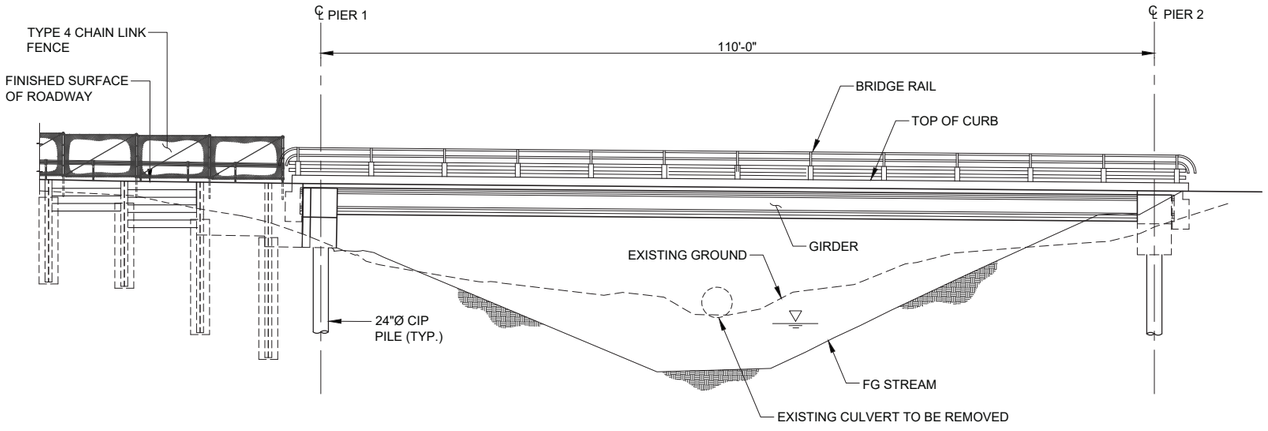
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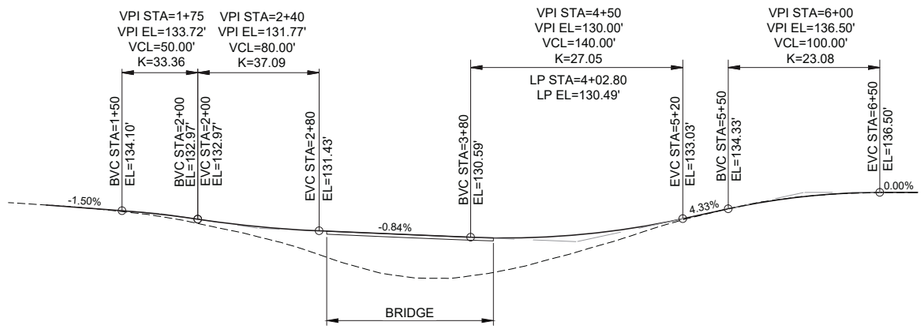
* SEE SHEET RD4.02
** SEE SHEET RD4.04

BRIDGE PLAN



BRIDGE ELEVATION

LOOKING WEST



55TH AVE NE PROFILE

TRANTECH Engineering LLC
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stulǝgʷa'bš
VILLAGE

HERRERA

PE-CHI S SHIH
STATE OF WASHINGTON
25583
REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN		
DESIGNED:	DRAWN:		
DESIGNED:	CHECKED: J. KING		
SCALE: AS SHOWN	APPROVED: C. AVOLIO		

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

BRIDGE PLAN AND ELEVATION

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: BR1.01
SHEET NO: 25 OF 61

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GENERAL NOTES:

1. CONSTRUCTION JOINTS SHOWN OPTIONAL UNLESS NOTED OTHERWISE.
2. FOR GEOTECHNICAL INFORMATION SEE ASPECT CONSULTING LLC REPORT INCLUDED IN THE BID DOCUMENTS.
3. FOR ABBREVIATIONS AND LEGEND, SEE DWGS. G1.01 AND G1.02.

STRUCTURAL NOTES:

CONSTRUCTION:

ALL MATERIALS AND WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE STATE OF WASHINGTON DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, DATED 2018, AMENDMENTS, TO BID DATE, AND SPECIAL PROVISIONS.

DESIGN:

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2017 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8th EDITION WITH 2018 INTERIM REVISIONS AND STATE OF WASHINGTON DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN MANUAL. SEISMIC DESIGN OF THIS STRUCTURE HAS BEEN DONE USING THE FOLLOWING SITE DATA:

SITE CLASS - D
SITE ADJUSTMENT - PEAK GROUND ACCELERATION COEFFICIENT - 0.39
DESIGN SPECTRAL ACCELERATION COEFFICIENT AT 0.2 SEC - 0.9
DESIGN SPECTRAL ACCELERATION COEFFICIENT AT 1.0 SEC - 0.48

DESIGN LOADS

DEAD LOAD:
WEIGHT OF NORMAL REINFORCED CONCRETE, 155 POUNDS PER CUBIC FOOT.
WEIGHT OF PRECAST PRESTRESSED GIRDERS, 165 POUNDS PER CUBIC FOOT.

LIVE LOAD:
HL-93

THERMAL FORCES:
NORMAL TEMPERATURE 64° F
TEMPERATURE RANGE, 35° F RISE, 45° F FALL
COEFFICIENT OF THERMAL EXPANSION, 0.000006.

PRESTRESSING REINFORCEMENT:
UNCOATED 7 WIRE 0.6 IN DIA, GRADE 270 LOW RELAXATION STRAND (AASHTO M203)

NON-PRESTRESSED REINFORCEMENT:
GENERAL:
AASHTO M31, GRADE 60 Fy = 60,000 PSI

STEEL CASING PIPES:
ASTM A252 GRADE 2 Fy = 35,000 PSI

STRUCTURAL STEEL:
AASHTO M270 GRADE 36 Fy = 36,000 PSI

FUTURE WEARING SURFACE:
25 PSF

CONCRETE

UNLESS NOTED OTHERWISE ON PLANS

CLASS 4000D:
BRIDGE DECK

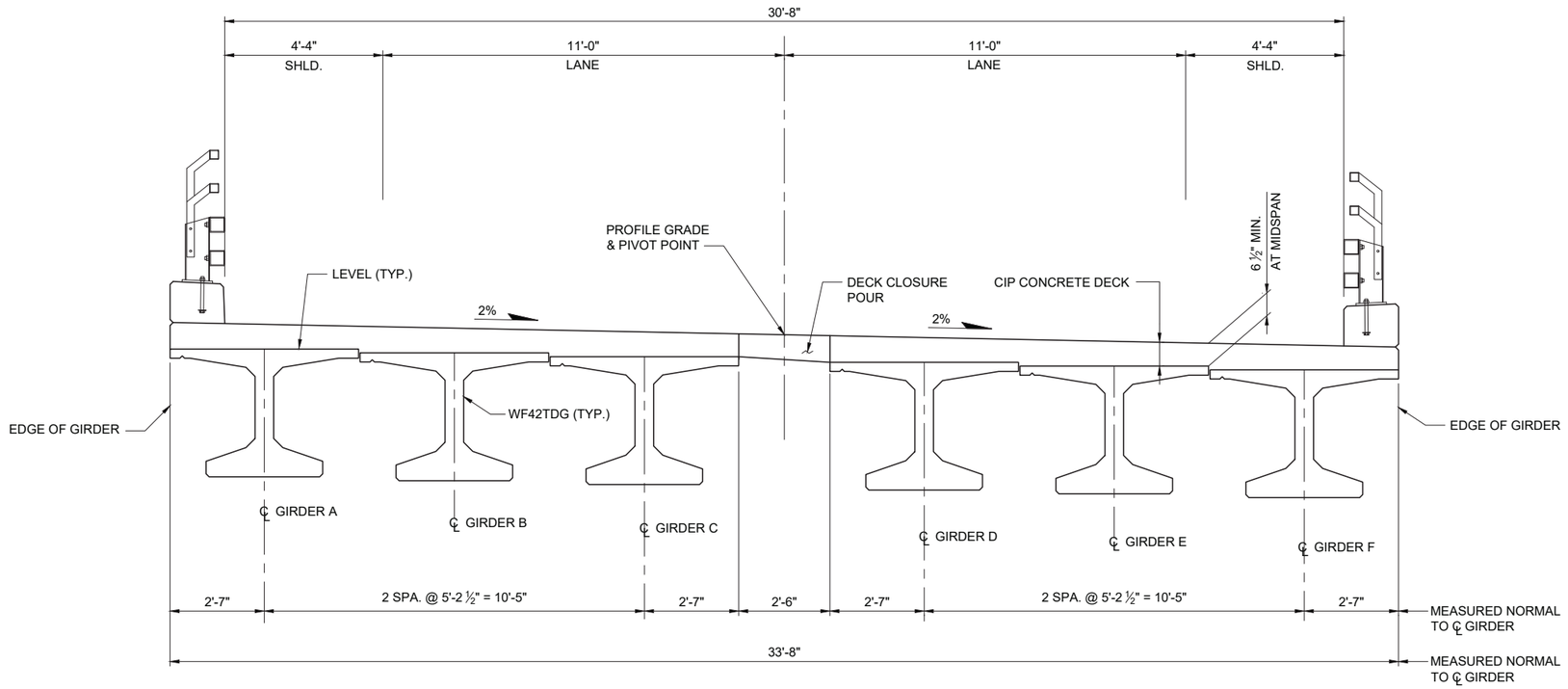
CLASS 5000P
CIP PILES

CLASS 4000
ALL OTHER

GENERAL

PLAN DIMENSIONS:

1. ALL PLAN DIMENSIONS SHOWN ARE MEASURED HORIZONTALLY OR VERTICALLY UNLESS OTHERWISE NOTED AND REFLECT THE ULTIMATE GEOMETRIC SHAPE AND LOCATION OF ALL ELEMENTS AT A MEAN TEMPERATURE OF 64° F.
2. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" UNLESS OTHERWISE SHOWN OR NOTED.
3. CONCRETE COVER MEASURED FROM THE FACE OF THE CONCRETE TO THE FACE OF ANY REINFORCEMENT BAR SHALL BE:
   3" - POURED AGAINST UNDISTURBED EARTH
   2 1/2" - TOP DECK REINFORCEMENT
   1 1/2" - ALL OTHER LOCATIONS
   UNLESS OTHERWISE SHOWN OR NOTED



TYPICAL BRIDGE SECTION

LOOKING AHEAD ON STATION
DECK WIDTH VARIES AT SOUTH END OF BRIDGE.
SEE "BRIDGE FRAMING PLAN" SHEET FOR DETAILS.

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PE CHI S SHIH — STATE OF WASHINGTON — 25583 — REGISTERED PROFESSIONAL ENGINEER
2/3/2020

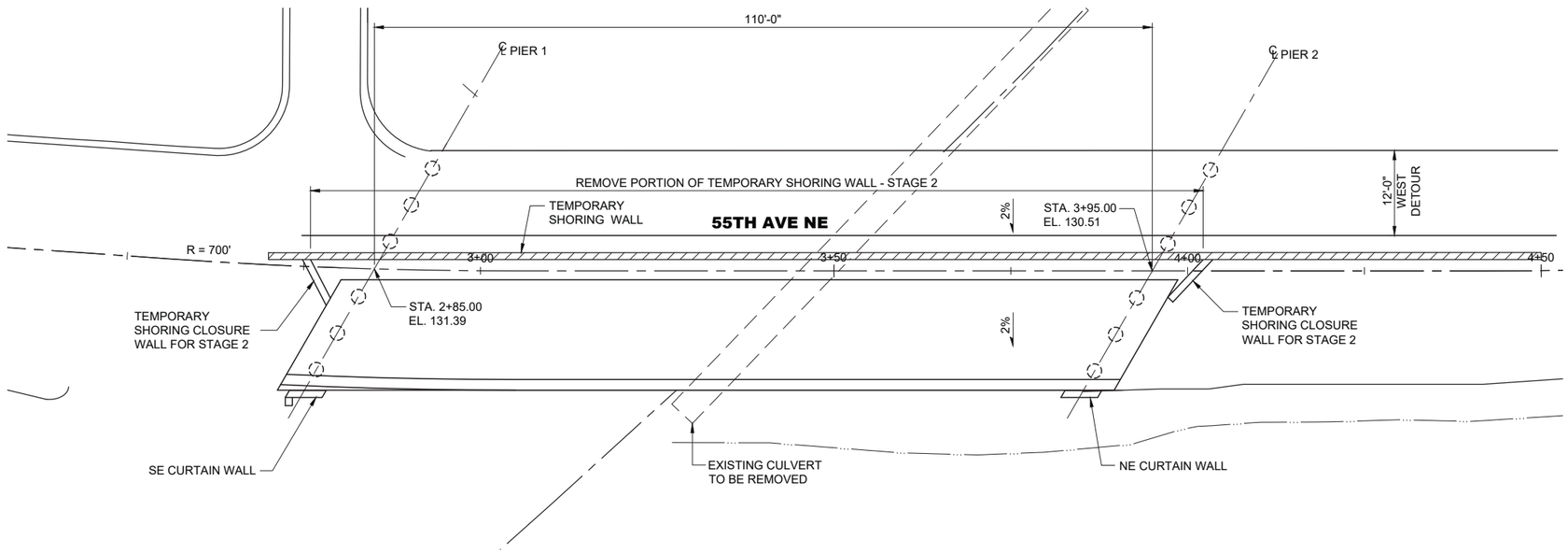
DESIGNED: S. SHIH	DRAWN: M. SCHAEFER	DATE: FEBRUARY 2020	
DESIGNED:	DRAWN: . JENSEN	PROJECT NO: 15-06057-005	
DESIGNED:	CHECKED: J. KING	DRAWING NO: BR2.01	
SCALE: AS SHOWN	APPROVED: C. AVOLIO	SHEET NO: 26 OF 61	

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

BRIDGE NOTES & TYPICAL SECTION

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BRIDGE CONSTRUCTION STAGE 1

STAGE 1:

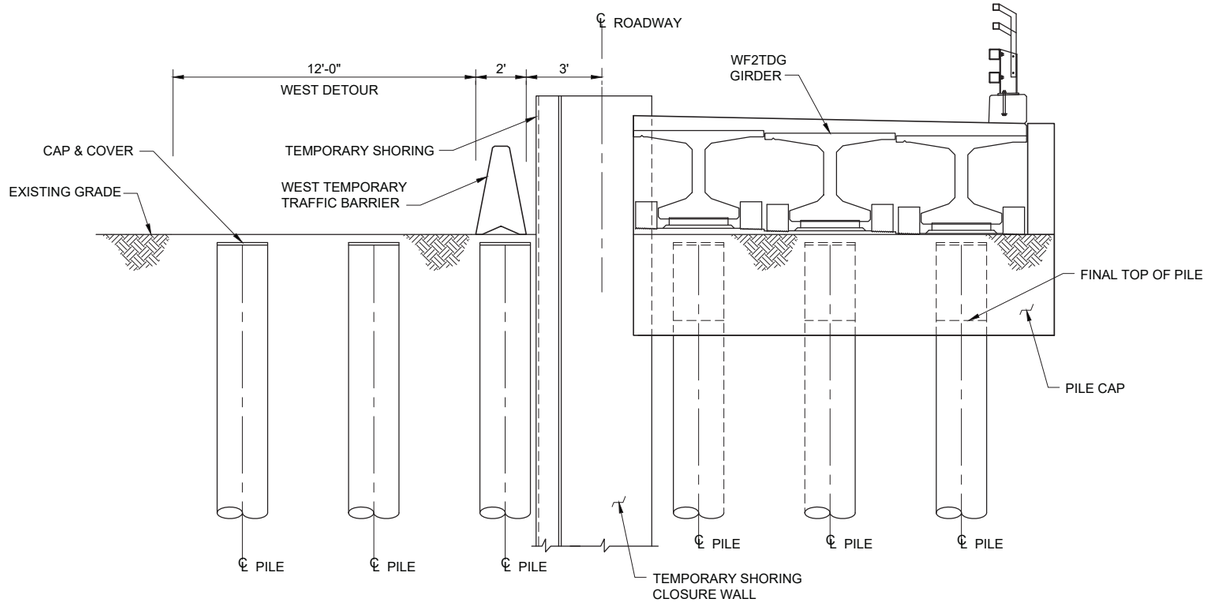
1. INSTALL ALL PILES, CAP AND COVER.
2. INSTALL WEST TEMPORARY BARRIER.
3. ROUTE TRAFFIC TO WEST DETOUR SIDE OF THE ROAD.
4. INSTALL TEMPORARY SHORING FOR PIER 1 & 2 SUBSTRUCTURE CONSTRUCTION.
5. CONSTRUCT SE RETAINING WALL.
6. CONSTRUCT EAST PORTION OF PIER 1 & 2.
7. CONSTRUCT EAST PORTION OF SUPERSTRUCTURE.
8. CONSTRUCT EAST APPROACHES.

STAGE 2:

1. INSTALL EAST TEMPORARY BARRIER.
2. REMOVE WEST TEMPORARY BARRIER AND ROUTE TRAFFIC TO NEW EAST DETOUR.
3. REMOVE PORTION OF TEMPORARY SHORING.
4. CONSTRUCT NW RETAINING WALL.
5. CONSTRUCT WEST PORTION OF PIER 1 & 2.
6. CONSTRUCT WEST PORTION OF SUPERSTRUCTURE.
7. CONSTRUCT WEST APPROACHES.

STAGE 3:

1. PLACE ALL CLOSURE POURS.
2. REMOVE TEMPORARY BARRIER.
3. REMOVE REMAINING TEMPORARY SHORING WALL.
4. COMPLETE APPROACHES.
5. OPEN TO ALL TRAFFIC.
6. REMOVE EXISTING CULVERT AND CONSTRUCT KACKMAN CREEK STREAM BED.



BRIDGE CONSTRUCTION STAGE 1

LOOKING UP STATION AT PIER 2 (PIER 1 SIMILAR)

ORIGINATED BY: / DATE:
CHECKED BY: / DATE:
BACK-CHECKED BY: / DATE:
CORRECTED BY: / DATE:
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2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN	DATE: FEBRUARY 2020	
DESIGNED:	DRAWN:	PROJECT NO: 15-06057-005	
DESIGNED:	CHECKED: J. KING	DRAWING NO: BR3.01	
SCALE: AS SHOWN	APPROVED: C. AVOLIO	SHEET NO: 27 OF 61	

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

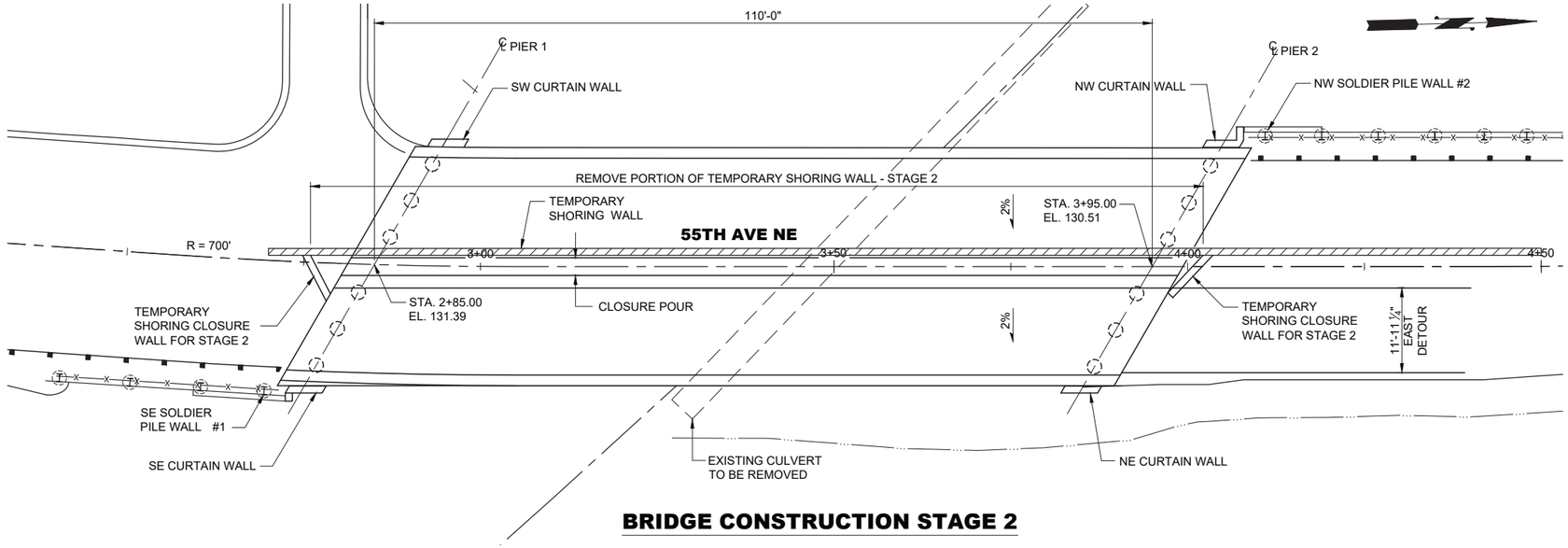
SUGGESTED BRIDGE CONSTRUCTION SEQUENCE 1

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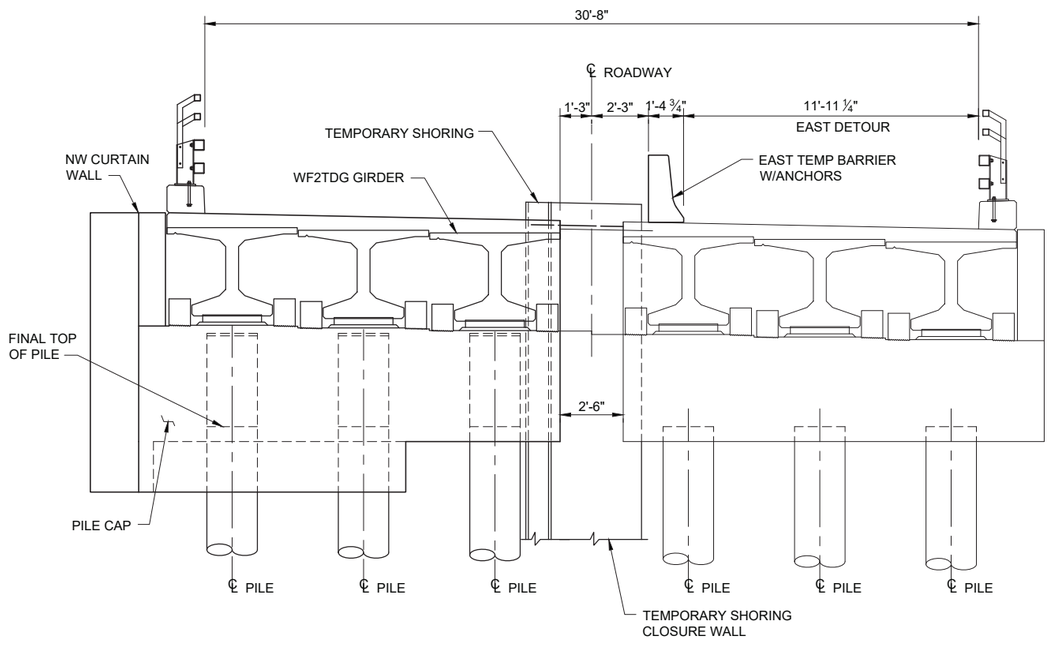
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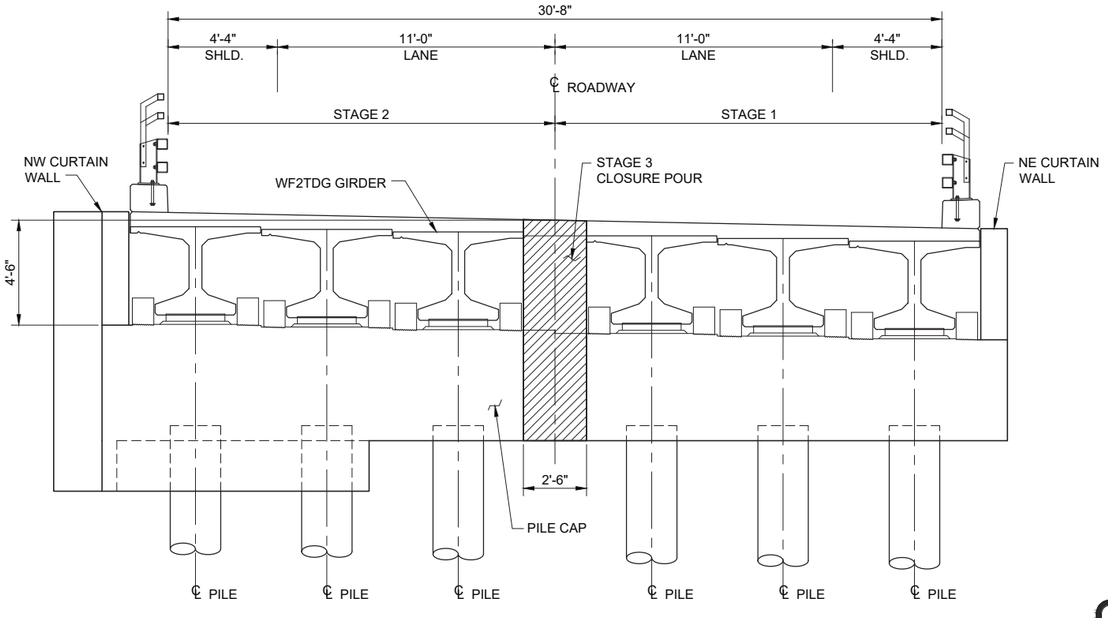


BRIDGE CONSTRUCTION STAGE 2



BRIDGE CONSTRUCTION STAGE 2

LOOKING UP STATION AT PIER 2 (PIER 1 SIMILAR)



BRIDGE CONSTRUCTION STAGE 3

LOOKING UP STATION AT PIER 2 (PIER 1 SIMILAR)

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DESIGNED: S. SHIH	DRAWN: D. JENSEN
DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

SUGGESTED BRIDGE CONSTRUCTION SEQUENCE 2

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: BR3.02
SHEET NO: 28 OF 61

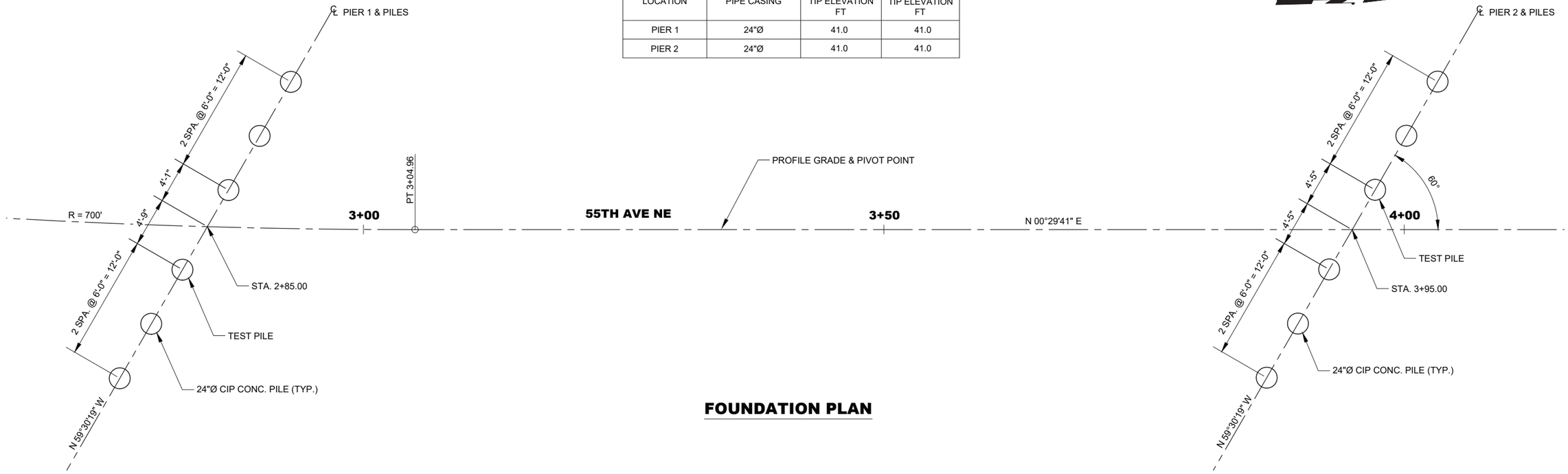
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LOCATION	PIPE CASING	MINIMUM TIP ELEVATION FT	ESTIMATED TIP ELEVATION FT
PIER 1	24"Ø	41.0	41.0
PIER 2	24"Ø	41.0	41.0



FOUNDATION PLAN

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25583
REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN
DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

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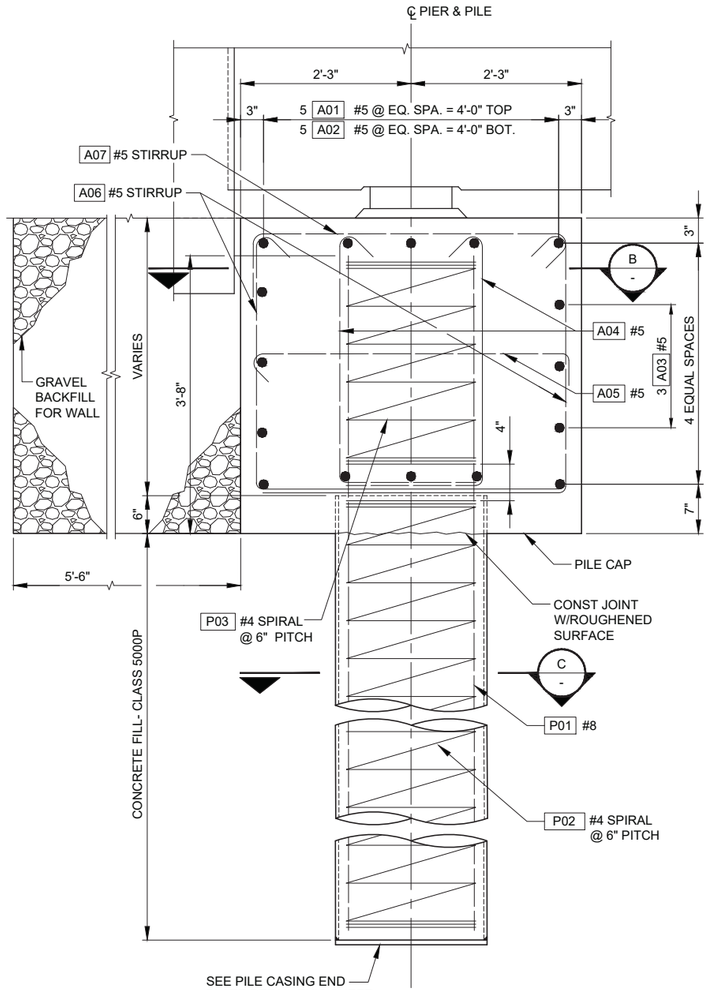
BRIDGE FOUNDATION LAYOUT

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: BR4.01
SHEET NO: 29 OF 61

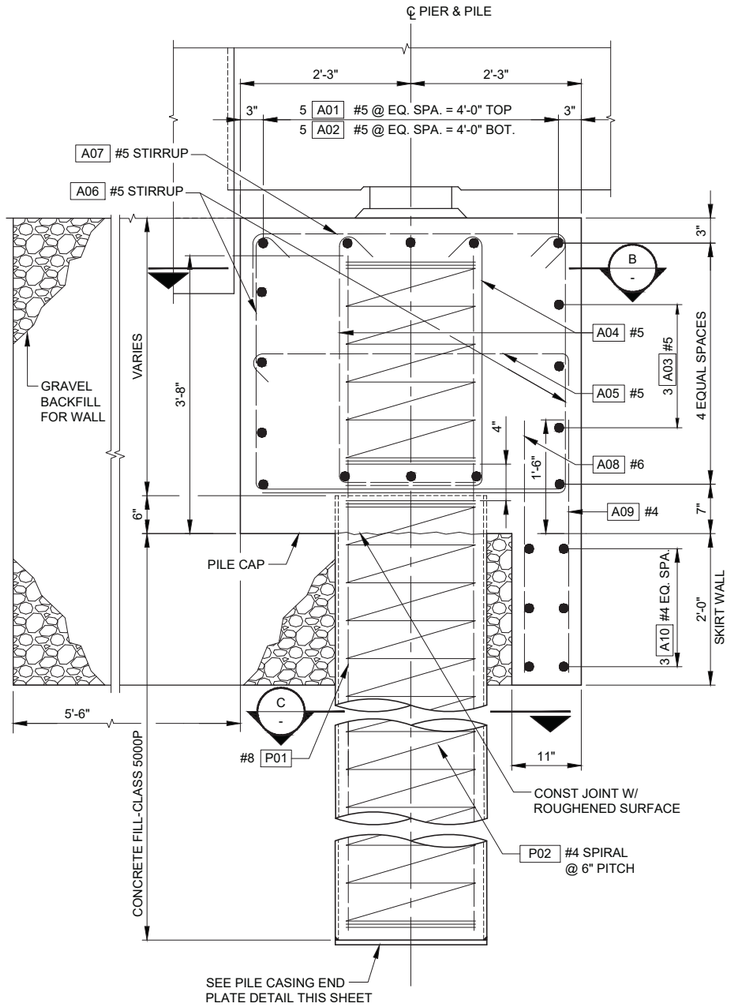
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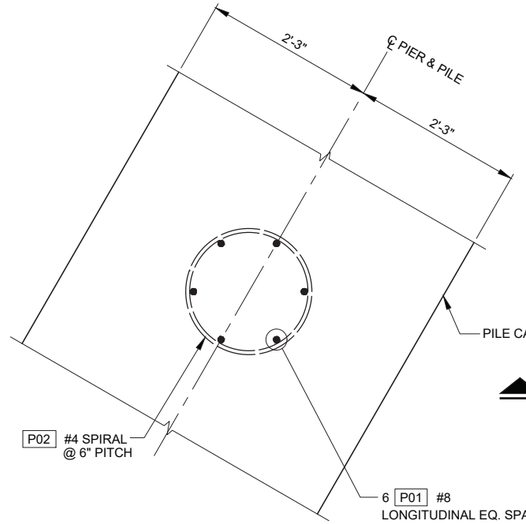
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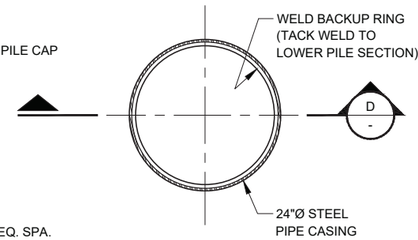
SECTION E / E — SCALE: NTS (BR4.03 / BR4.04)



SECTION A / A — SCALE: NTS (BR4.03 / BR4.04)



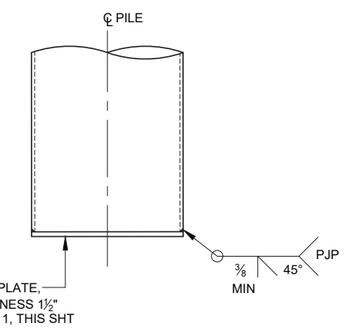
SECTION B / - — SCALE: NTS



PLAN VIEW

NOTE:
BACKUP RING MAY BE FABRICATED MADE FROM PILE CUT-0FFS OR OTHER MATERIAL OF LIKE QUALITY.

SECTION C / - — SCALE: NTS



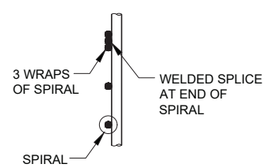
SECTION D / - — SCALE: NTS

DETAIL 2 / - — SCALE: NTS

PIPE CASING SPLICE DETAIL

NOTES:

1. CONTRACTOR TO DETERMINE PIPE CASING AND END PLATE THICKNESS. PILE SHALL BE DRIVEN TO A MINIMAL ULTIMATE CAPACITY OF 400 TON PER PILE, TO BE VERIFIED BY PDA ANALYSIS. A MINIMUM OF 2 PASSING PDA ANALYSIS SHALL BE CONDUCTED.
2. PIPE CASING THICKNESS SHALL BE ½" MINIMUM.
3. CIP PILE MINIMUM TIP ELEVATION IS SHOWN ON SHEET BR4.02.
4. ADJUST BAR A02 SPACING TO CLEAR BAR P01.



SPIRAL TERMINATION DETAIL

PIPE CASING END PLATE DETAIL

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\\BHM-SRVR-01\Bellingham Projects\20172017019 - Stillaguamish Kackman Creek Culvert\i900 CAD\010 Drawing\C-Structural Sheet\20171019_BD.DWG | 1/31/2020 3:55 PM | Donna.Jensen

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STILLAGUAMISH stulǝgʷaʔbš VILLAGE

HERRERA

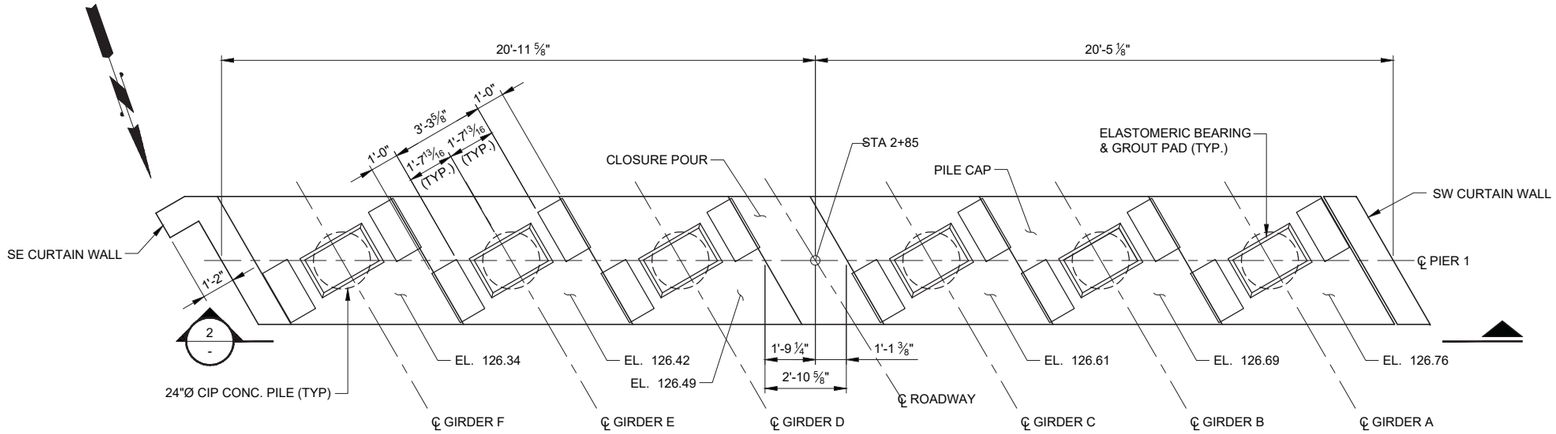
PE CHI S SHIH — STATE OF WASHINGTON — 25583 — REGISTERED PROFESSIONAL ENGINEER — 2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN	DATE: FEBRUARY 2020	
DESIGNED:	DRAWN:	PROJECT NO: 15-06057-005	
DESIGNED:	CHECKED: J. KING	DRAWING NO: BR4.02	
SCALE: AS SHOWN	APPROVED: C. AVOLIO	SHEET NO: 30 OF 61	

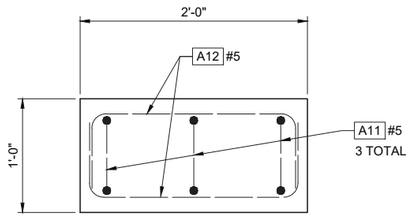
KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

BRIDGE FOUNDATION DETAILS

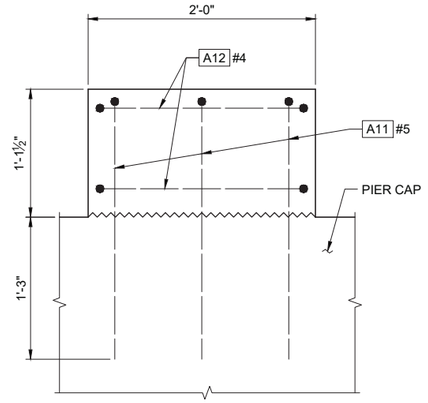
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PIER 1 - PLAN

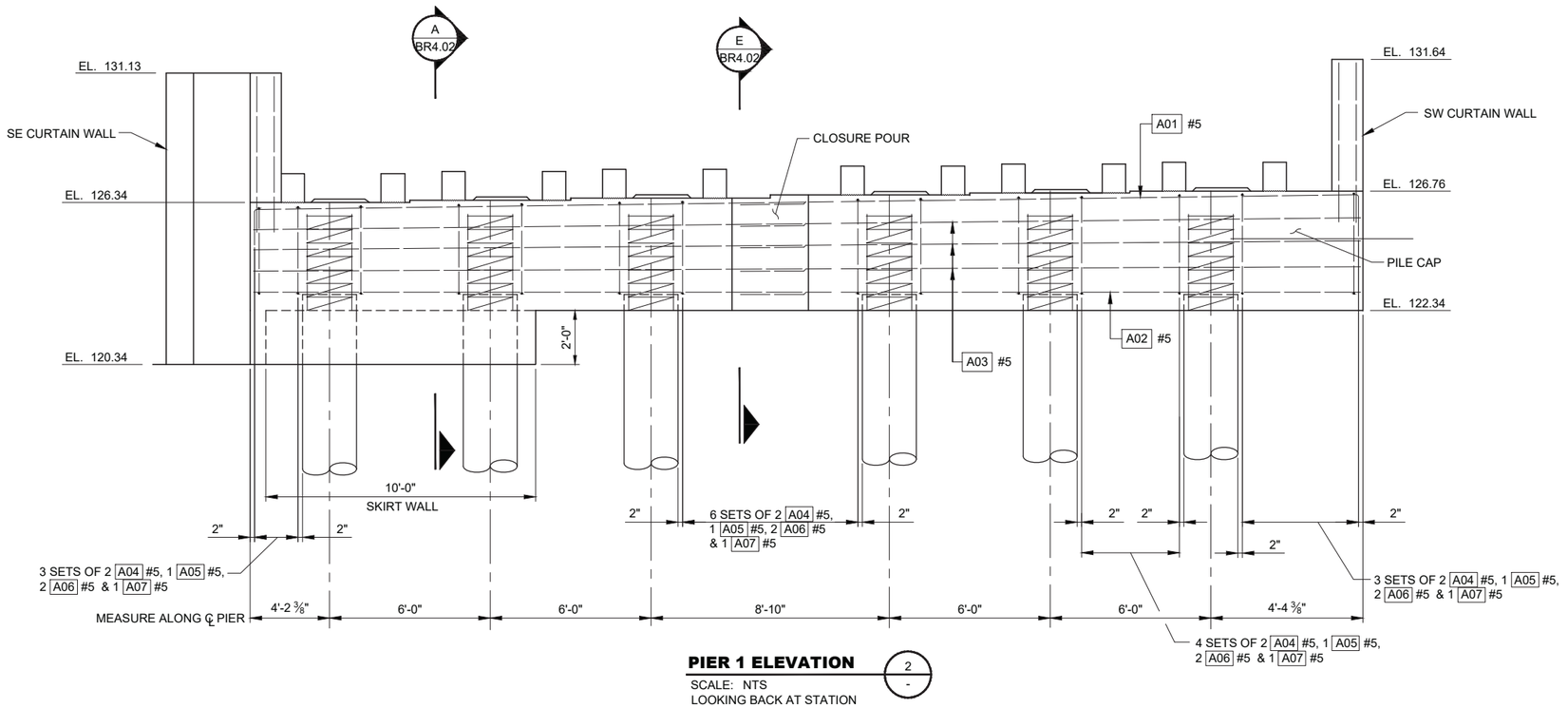


GIRDER STOP PLAN



GIRDER STOP ELEVATION

GIRDER STOP DETAILS



PIER 1 ELEVATION (2 / -)

SCALE: NTS
LOOKING BACK AT STATION

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VILLAGE

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2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN
DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

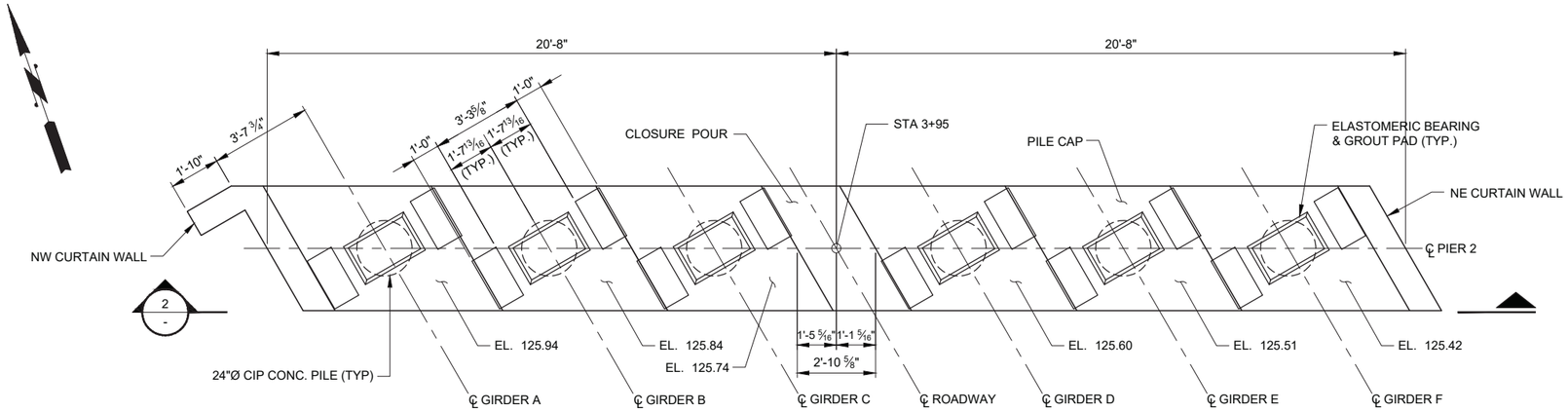
KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

PIER 1 PLAN AND ELEVATION

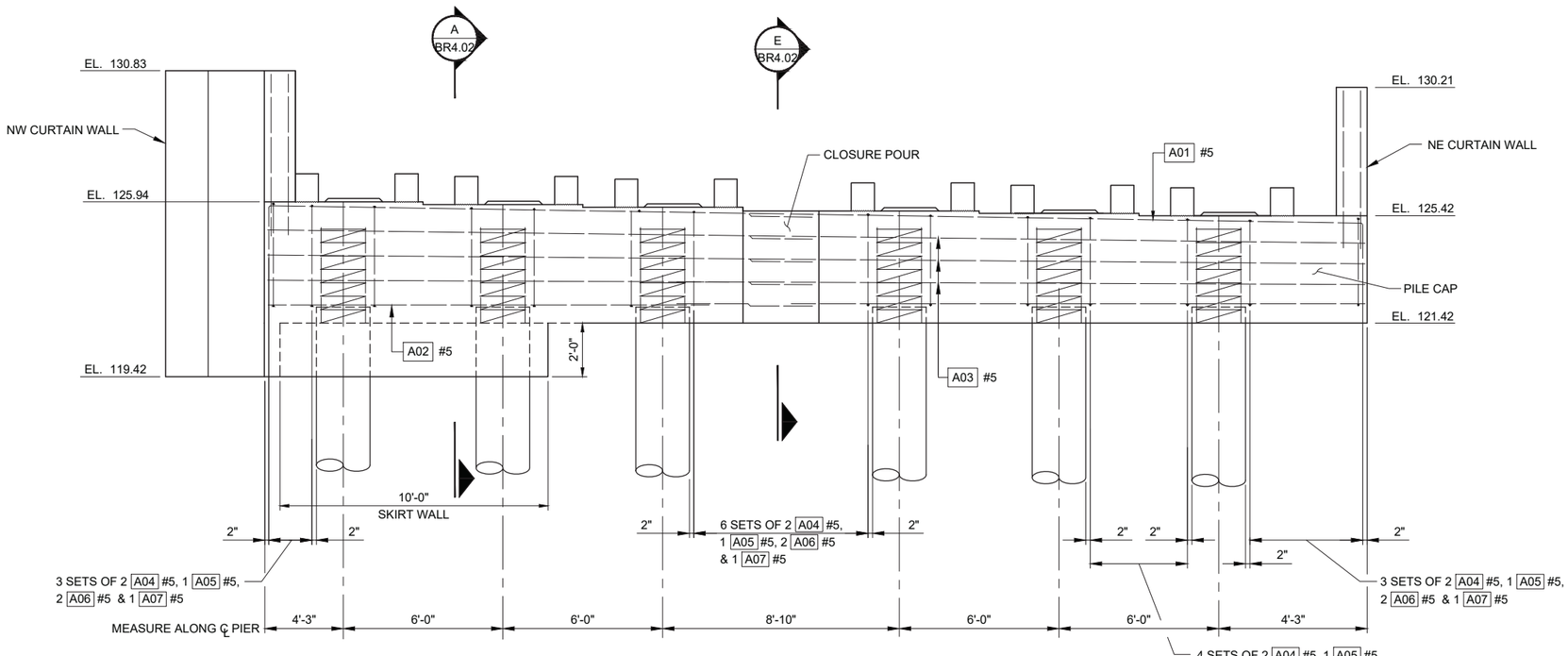
DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: BR4.03
SHEET NO: 31 OF 61

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NOTE:
SEE PIER 1 SHEET BR4.03 FOR GIRDER STOP DETAILS.



PIER 2 - PLAN



PIER 2 ELEVATION
SCALE: NTS
LOOKING AHEAD ON STATION
2
-

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VILLAGE

HERRERA

PE-CHI S SHIH
STATE OF WASHINGTON
25583
REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

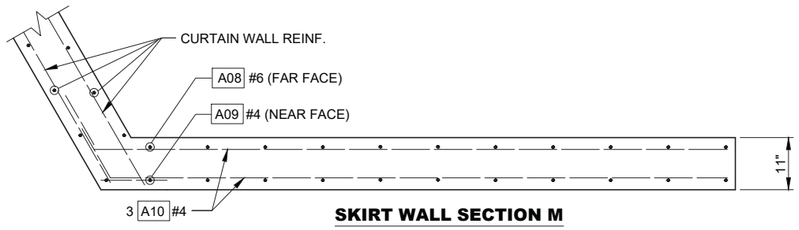
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DESIGNED:	DRAWN:		
DESIGNED:	CHECKED: J. KING		
SCALE: AS SHOWN	APPROVED: C. AVOLIO		

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

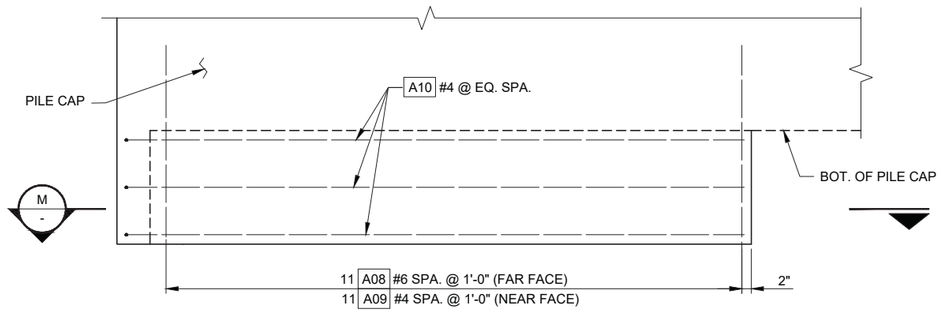
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DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: BR4.04
SHEET NO: 32 OF 61

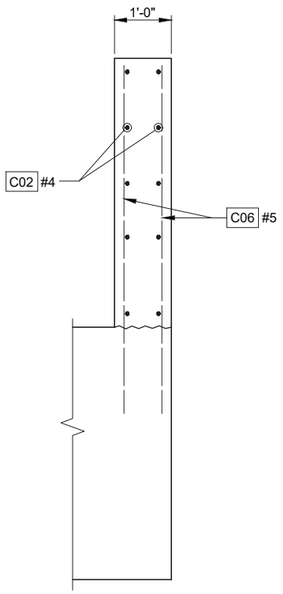
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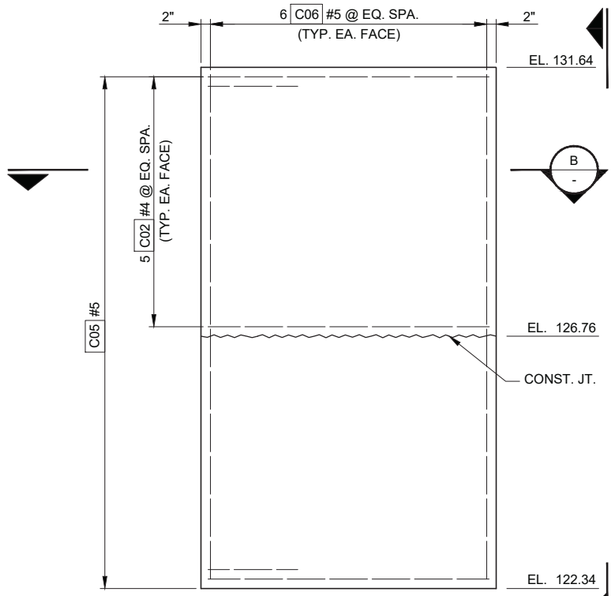
SKIRT WALL SECTION M



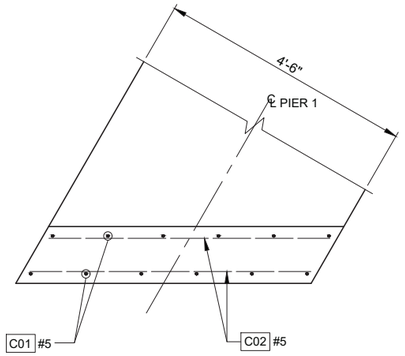
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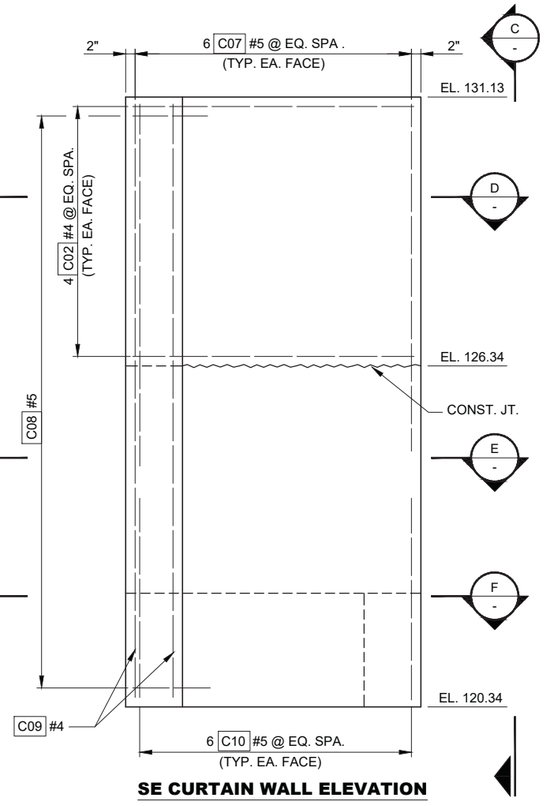
VIEW A



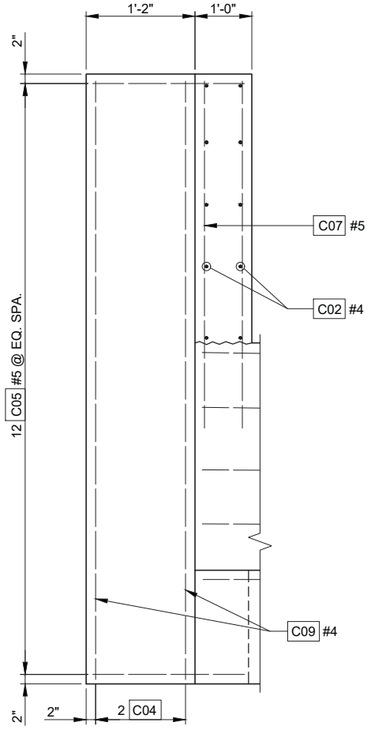
SW CURTAIN WALL ELEVATION



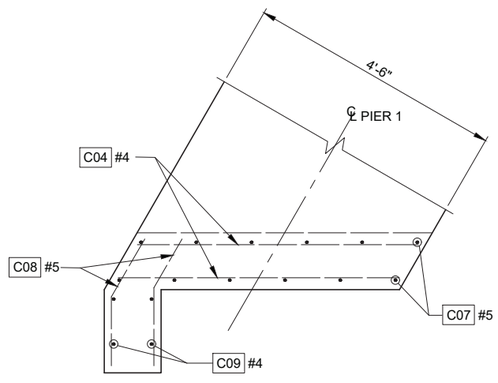
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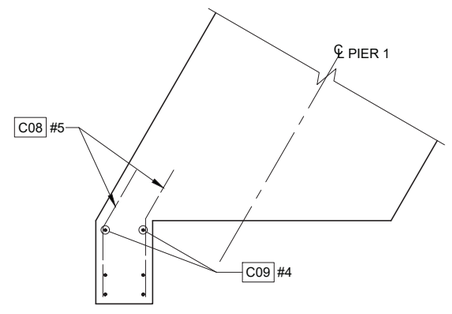
SE CURTAIN WALL ELEVATION



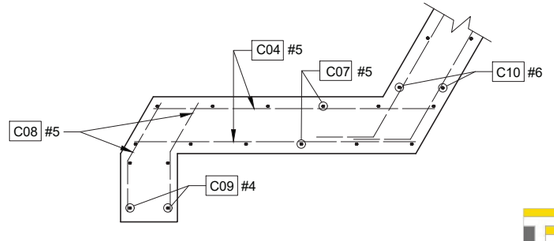
VIEW C



SECTION D



SECTION E



SECTION F

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VILLAGE

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P.E. CHI S SHIH — STATE OF WASHINGTON — 25583 — REGISTERED PROFESSIONAL ENGINEER
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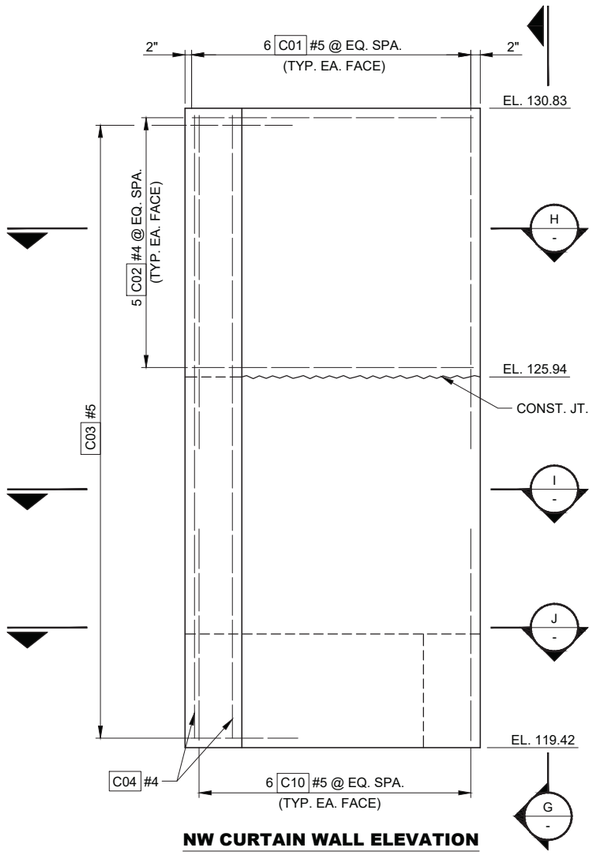
DESIGNED: S. SHIH	DRAWN: D. JENSEN		
DESIGNED:	DRAWN:		
DESIGNED:	CHECKED: J. KING		
SCALE: AS SHOWN	APPROVED: C. AVOLIO		

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

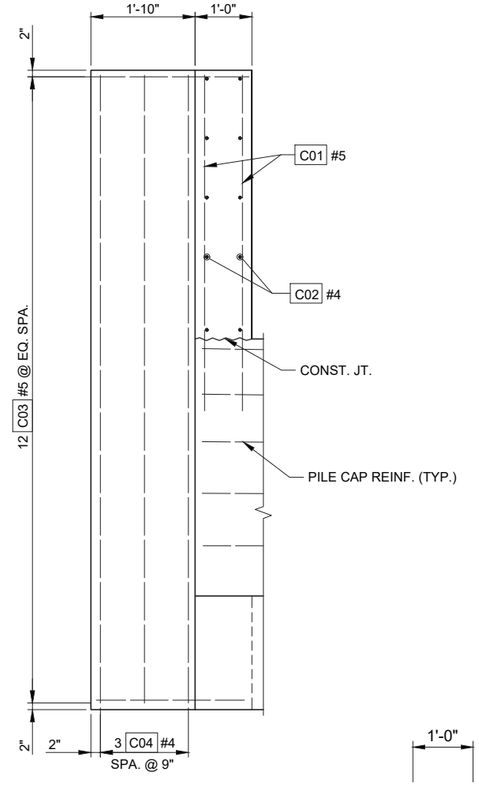
BRIDGE CURTAIN WALL DETAILS 1

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: BR4.05
SHEET NO: 33 OF 61

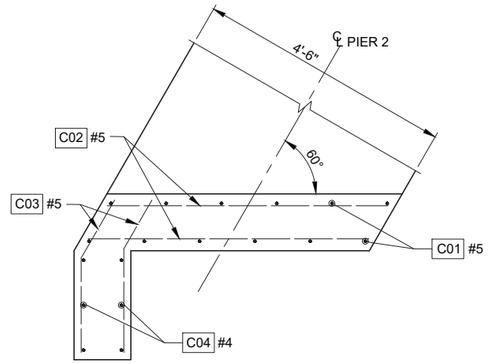
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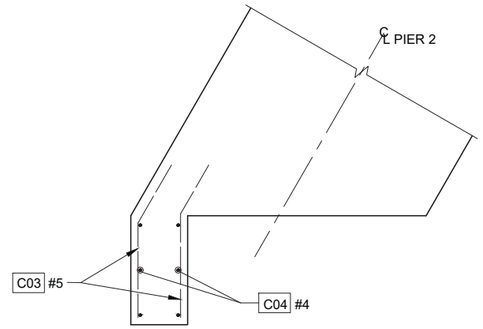
NW CURTAIN WALL ELEVATION



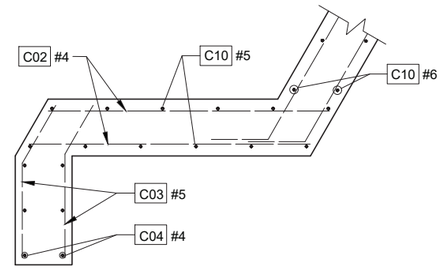
VIEW G



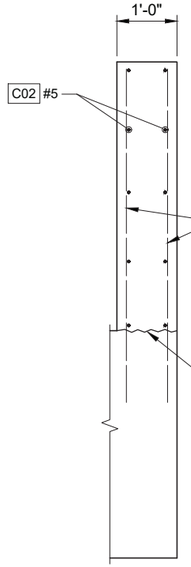
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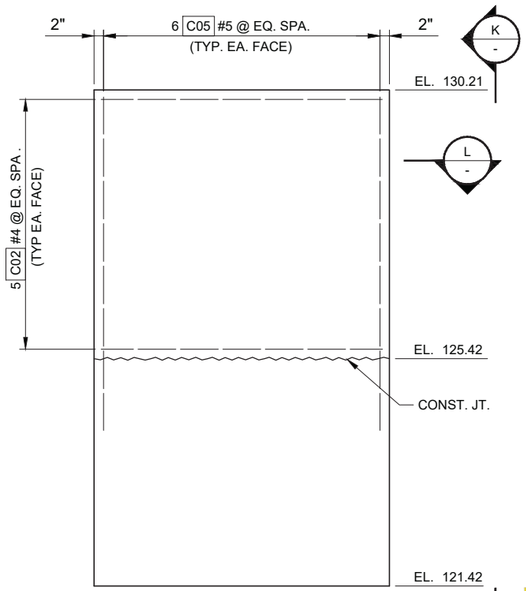
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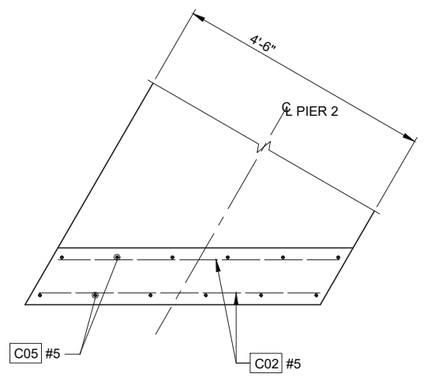
SECTION J



VIEW K



NE CURTAIN WALL ELEVATION



SECTION L

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P.E. CHI S. SHIH — STATE OF WASHINGTON — 25583 — REGISTERED PROFESSIONAL ENGINEER
2/3/2020

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DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

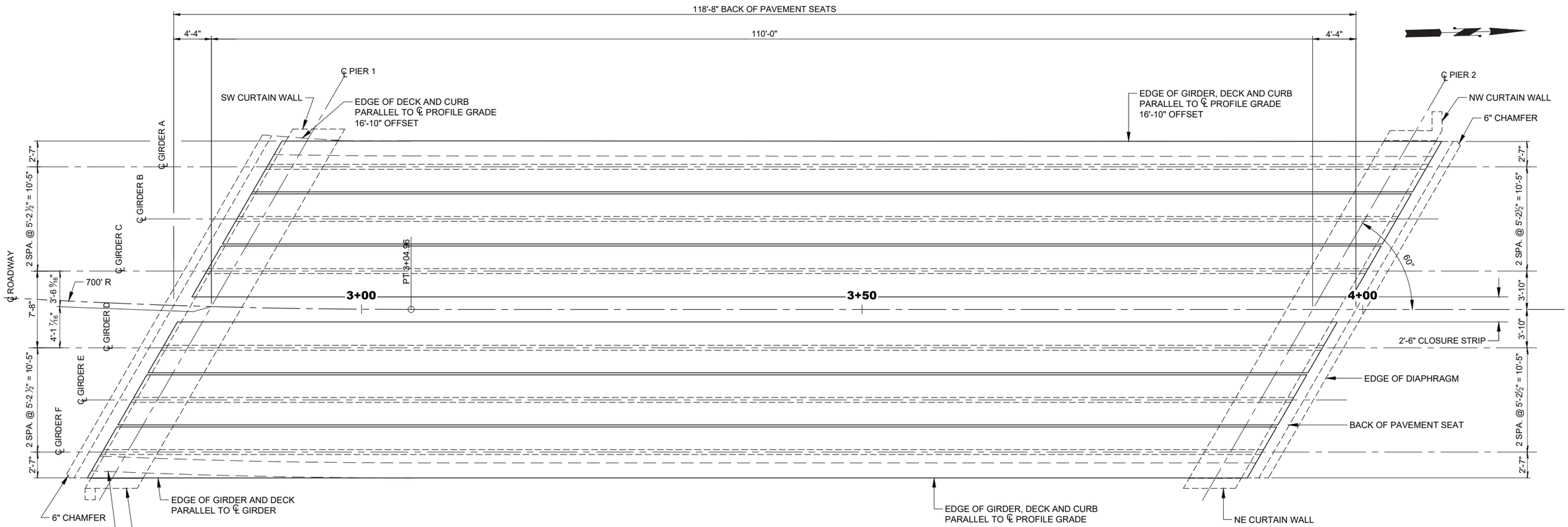
KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

BRIDGE CURTAIN WALL DETAILS 2

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: BR4.06
SHEET NO: 34 OF 61

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SW 1/4 SEC. 34. T. 32 N., R. 5 E., W.M.



FRAMING PLAN

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DESIGNED:	DRAWN:	PROJECT NO: 15-06057-005	
DESIGNED:	CHECKED: J. KING	DRAWING NO: BR4.07	
SCALE: AS SHOWN	APPROVED: C. AVOLIO	SHEET NO: 35 OF 61	

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

BRIDGE FRAMING PLAN

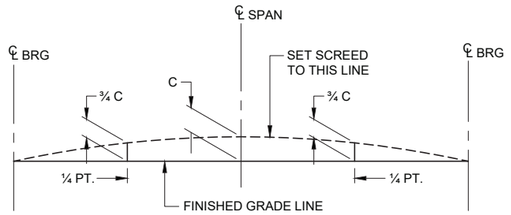
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GIRDER SCHEDULE

SPAN	GIRDER	GIRDER SERIES	TOP FLANGE WIDTH W	PLAN LENGTH (ALONG GIRDER GRADE) (SEE NOTE 1)	GIRDER END DETAILS							MIN. CONC. COMP. STRENGTH		NUMBER OF STRANDS (SEE GIRDER NOTE 2)			LOCATION OF C.G. STRANDS			STRAIGHT STRANDS TO EXTEND				"A" DIMENSION AT ℄ BEARINGS	DECK SCREED CAMBER C	MIDSPAN VERTICAL DEFLECTION D		REINFORCEMENT DETAILS						SHIPPING AND HANDLING DETAILS					
					END 1 TYPE	END 2 TYPE	L_d	θ_1	θ_2	P_1	P_2	@ 28-DAYS $F'C$ (KSI)	@ RELEASE $F'CI$ (KSI)	STRAIGHT	HARPED	TEMPORARY	E	$F_{℄}$	F_O	END 1		END 2				LOWER BOUND @ 40 DAYS	UPPER BOUND @ 120 DAYS	ZONE 1		ZONE 2		ZONE 3		MAXIMUM MIDSPAN VERTICAL DEFLECTION AT SHIPPING	L	L_1	L_2	K_Θ MINIMUM SHIPPING SUPPORT ROTATIONAL SPRING CONSTANT	W_{CC} MINIMUM SHIPPING SUPPORT CNTR.-TO-CNTR. WHEEL SPACING
																				STRANDS	EXTENSION LENGTH	STRANDS	EXTENSION LENGTH					SPACING	LENGTH	SPACING	LENGTH	SPACING	LENGTH						
1	A-F	WF 42TDG	5'-2"	115'-8 ⅛"	A	A	-	60°	60°	2'-10"	2'-10"	8.5	6.7	34	12	2	3"	4 ¾"	9	③TO④ ⑮TO⑳	1 1/4"	③TO④ ⑮TO⑳	1'-4"	11"	2 ½"	2 ½"	5 ¾"	2 ¼"	1'-10 ½"	6"	12'-0"	9"	9'-9"	1 15/16"	3'-0"	3'-6"	3'-6"	40,000 KIP. IN / RAD.	6'-0"



SCREED SETTING DIMENTIONS

SCALE: NTS

FOR DIMENSION "C" SEE GIRDER SCHEDULE

GIRDER NOTES:

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL PRETENSIONED AND TEMPORARY STRANDS SHALL BE 0.6"Ø AASHTO M203 GRADE 270 LOW RELAXATION STRANDS, JACKED TO 202.5 KSI.

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STILLAGUAMISH
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VILLAGE

HERRERA

PE-CHI S SHIH
STATE OF WASHINGTON
25583
REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN
DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

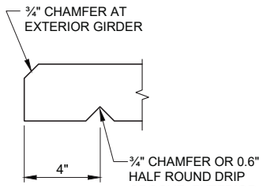
PRESTRESSED GIRDER DETAILS 1

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: BR4.08
SHEET NO: 36 OF 61

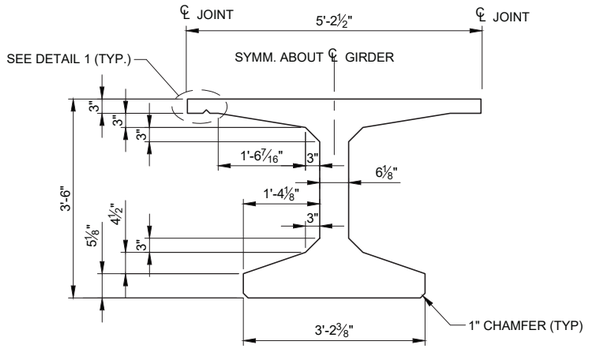
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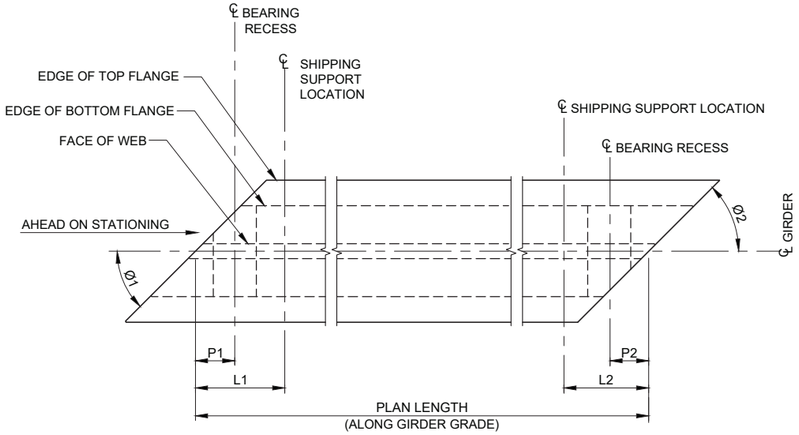
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DETAIL 1
SCALE: NTS

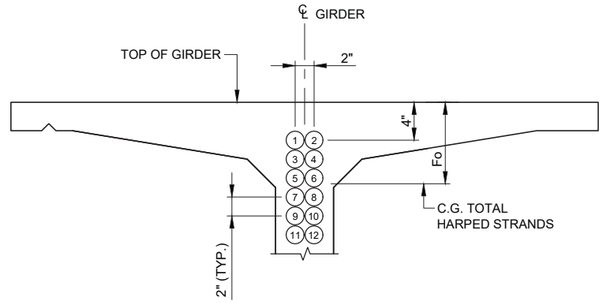


SECTION A
SCALE: NTS
REINFORCEMENT AND STRANDS NOT SHOWN

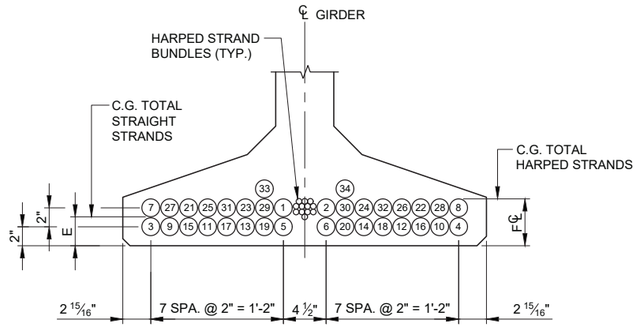


END 1 **END 2**

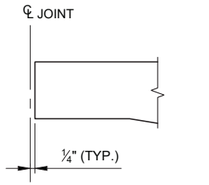
GIRDER PLAN
SCALE: NTS



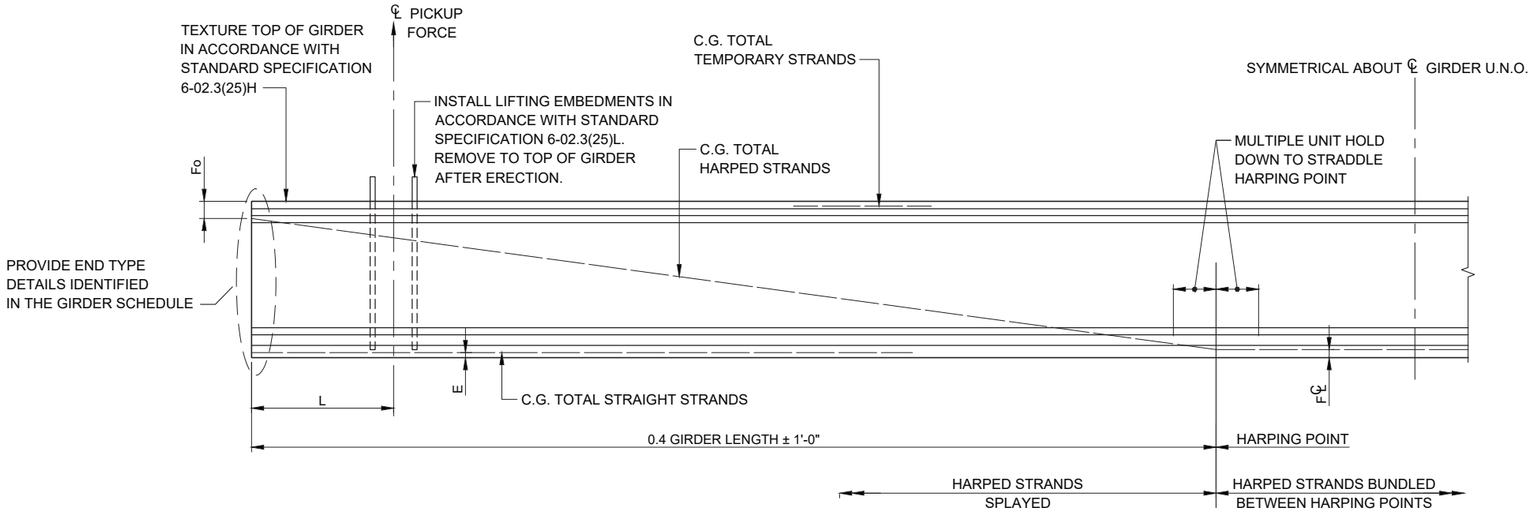
VIEW B
SCALE: NTS
HARPED STRAND LOCATION
SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



SECTION A
SCALE: NTS
STRAIGHT STRAND LOCATION
SEQUENCE SHALL BE AS SHOWN , ETC.



DETAIL 1
SCALE: NTS



GIRDER ELEVATION
SCALE: NTS

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HERRERA

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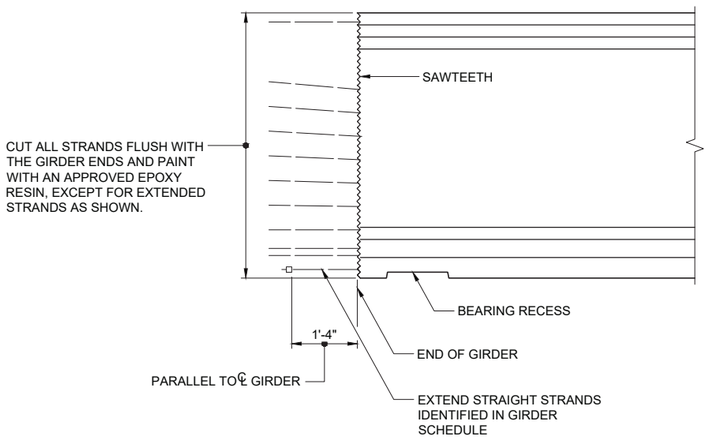
DESIGNED: S. SHIH	DRAWN: D. JENSEN
DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

PRESTRESSED GIRDER DETAILS 2

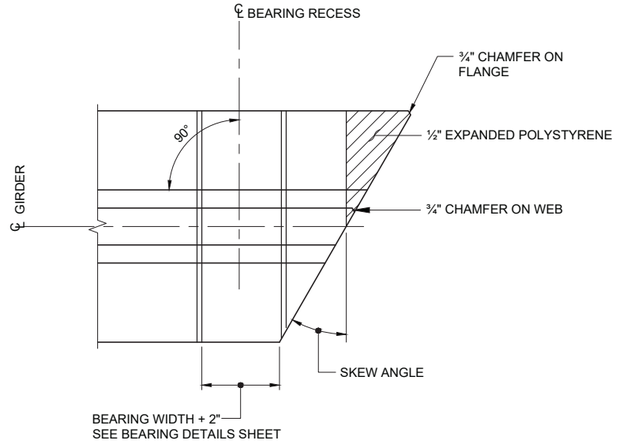
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PROJECT NO: 15-06057-005
DRAWING NO: BR4.09
SHEET NO: 37 OF 61

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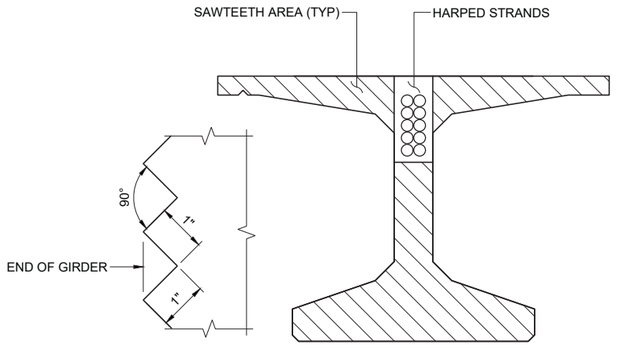


END TYPE A

SCALE: NTS



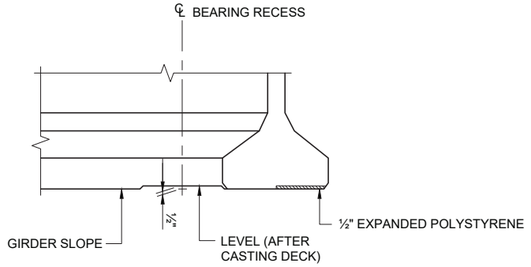
PLAN



SAWTEETH DETAIL

SCALE: NTS

SAWTEETH SHALL BE FULL WIDTH OVER AREA SHOWN



ELEVATION

BEARING RECESS AND BOTTOM FLANGE SPALL PROTECTION DETAIL

SCALE: NTS

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VILLAGE

HERRERA

P.E. CHI S. SHIH
STATE OF WASHINGTON
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REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

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DESIGNED:		DRAWN:	
DESIGNED:		CHECKED:	J. KING
SCALE:	AS SHOWN	APPROVED:	C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

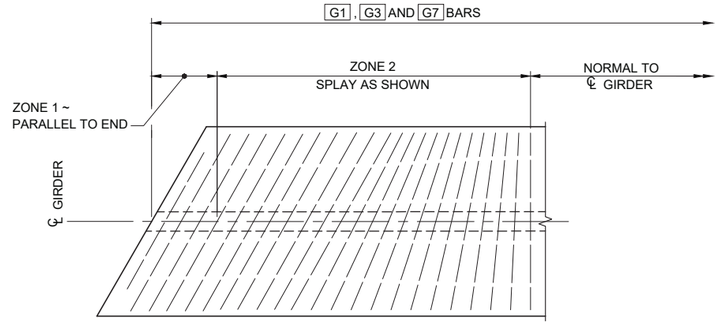
PRESTRESSED GIRDER DETAILS 3

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	BR4.10
SHEET NO:	38 OF 61

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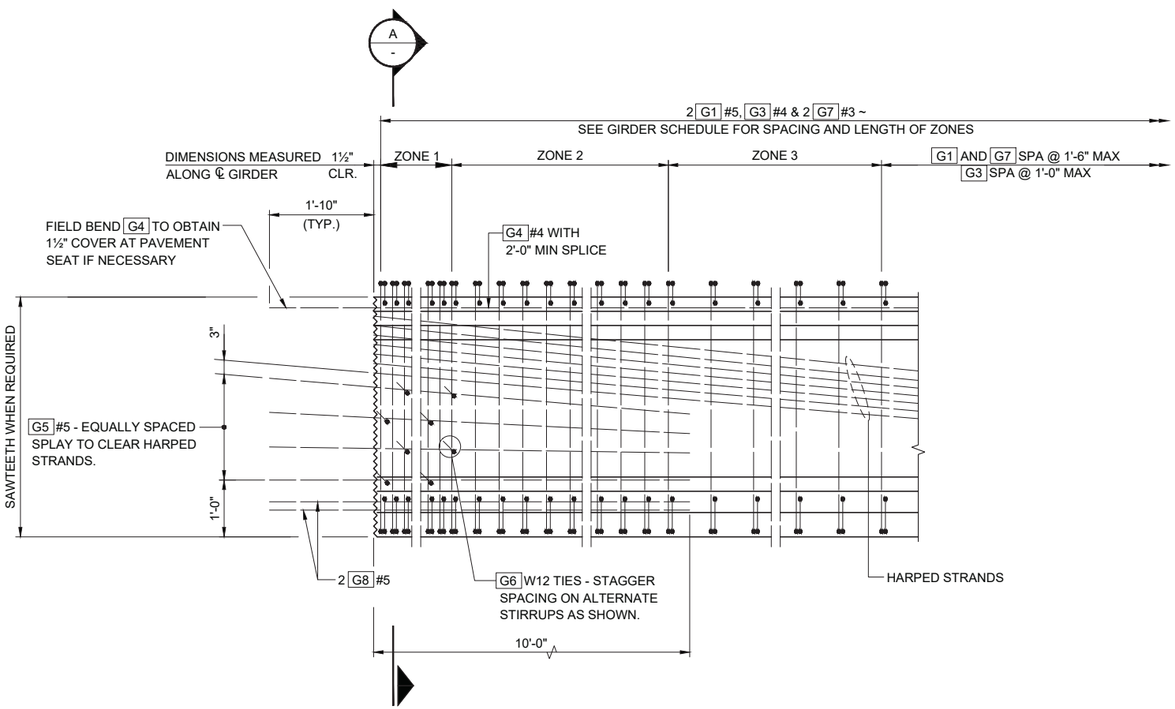
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PLAN-TRANSVERSE REINFORCING AT SKEWED ENDS

SCALE: NTS
LENGTHS OF G3 AND G7 VARY WITH SKEW.
ONLY TRANSVERSE REINFORCEMENT SHOWN

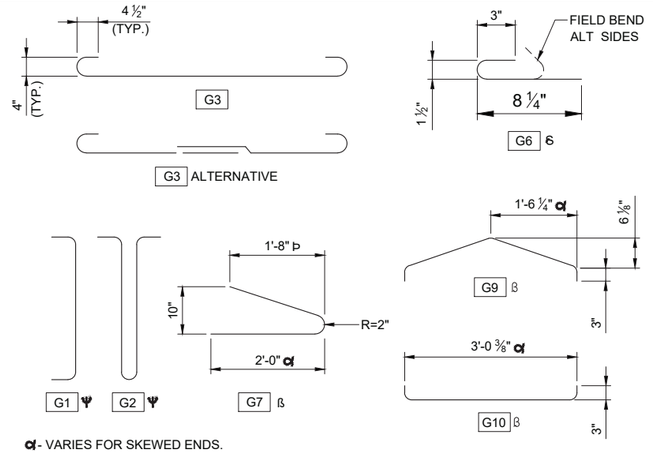


REINFORCEMENT END ELEVATION

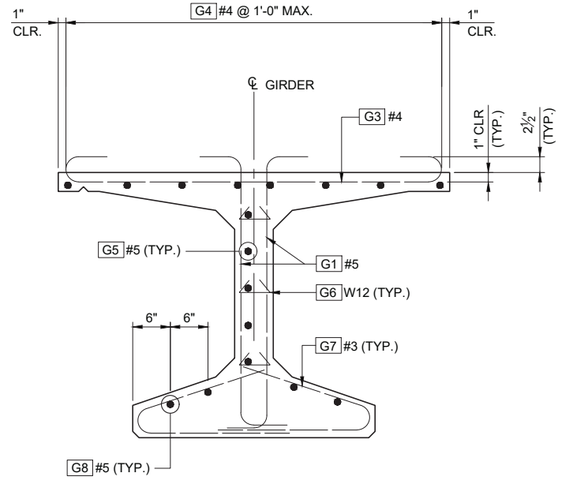
SCALE: NTS
STRAIGHT AND TEMPORARY STRANDS NOT SHOWN

BENDING DIAGRAM

(ALL DIMENSIONS ARE OUT TO OUT)



ɑ - VARIES FOR SKEWED ENDS.
ɞ - #3 OR #4 MAY BE SUBSTITUTED. FIELD BENDING IS OPTIONAL.
ß - PAIRS OF G7 BARS, OR G9 AND G10 BARS, MAY BE USED INTERCHANGEABLY AS BOTTOM FLANGE TIES.
Ψ - 1 G2 MAY BE SUBSTITUTED FOR 2 G1 WITHIN ZONE 1.



SECTION

SCALE: NTS
STRANDS NOT SHOWN

A
-

GIRDER REINFORCEMENT NOTES:

1. DEFORMED WELDED WIRE REINFORCEMENT MAY BE SUBSTITUTED FOR MILD REINFORCEMENT IN ACCORDANCE WITH STANDARD SPECIFICATION 6-02.3(25)A.

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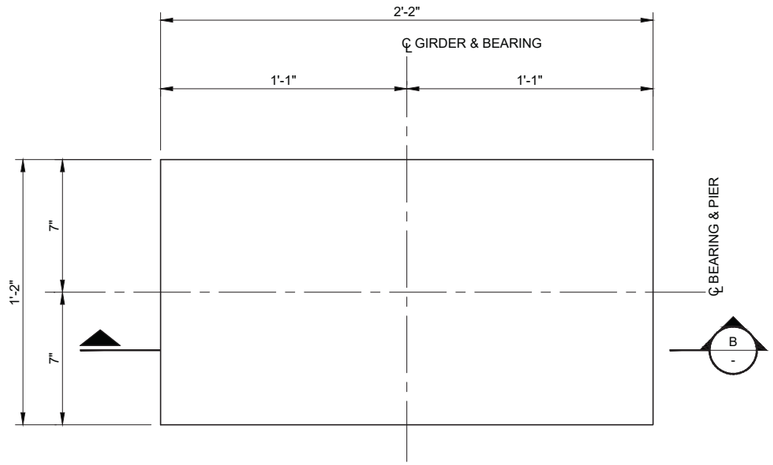
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DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
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KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

PRESTRESSED GIRDER DETAILS 4

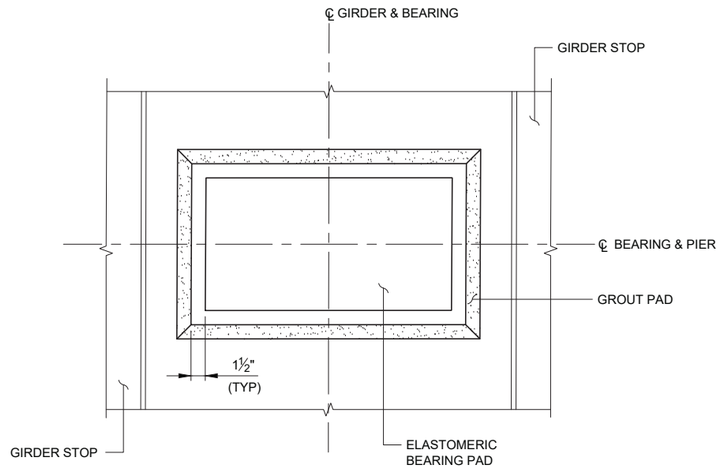
DATE: FEBRUARY 2020
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PLAN-ELASTOMERIC BEARING PAD

SCALE: NTS



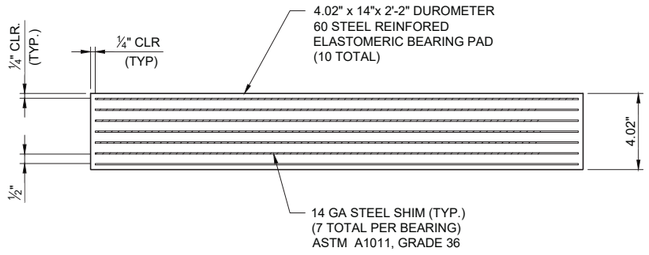
PLAN-ELASTOMERIC BEARING PAD

SCALE: NTS

NOTES:

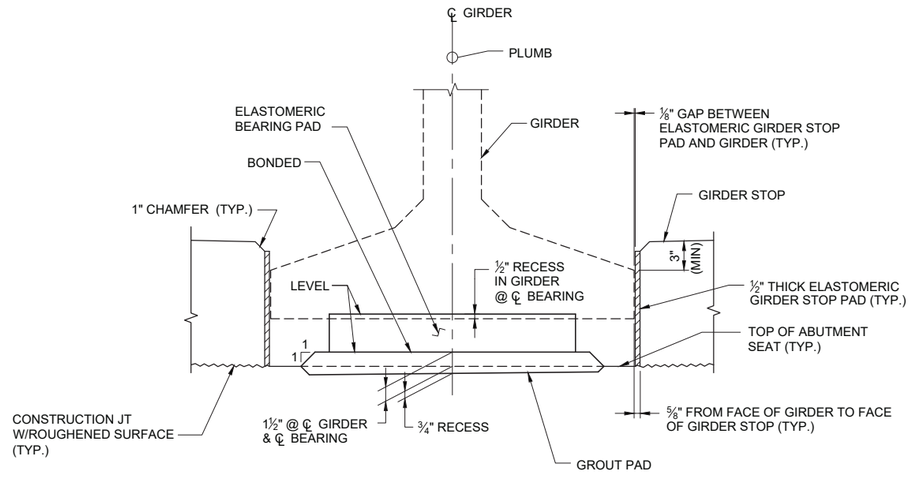
1. FABRICATE AND TEST ALL BEARINGS IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATONS METHOD B, AND AASHTO SPECIFICATION M251, TEST REQUIREMENTS.
2. STEEL SHIMS FOR ELASTOMERIC BEARING PADS SHALL BE FABRICATED FROM MATERIAL MEETING ASTM A 1011, STRUCTURAL STEEL GRADE 36, TYPE 1.
3. ELASTOMER SHALL BE 60 DUROMETER HARDNESS MATERIAL MEETING AASHTO SPECIFICATION M 251 REQUIREMENTS. ELASTOMER SHEAR MODULUS SHALL BE 100 PSI MINIMUM, 175 PSI MAXIMUM, TESTED IN ACCORDANCE WITH AASHTO SPECIFICATION M 251. AASHOTO LOW-TEMPERATURE ZONE = D, AND MINIMUM LOW-TEMPERATURE ELASTOMER GRADE = 4.
4. GIRDER STOPS SHALL BE CONSTRUCTED AFTER PLACEMENT OF GIRDERS. ELASTOMERIC PADS BETWEEN GIRDER AND GIRDER STOPS SHALL BE PLACED AFTER CONSTRUCTION OF THE GIRDER STOPS. THE PADS SHALL BE BONDED TO GIRDER STOPS WITH PRE-APPROVED ADHESIVE.
5. THE ELASTOMERIC BEARING PAD SHALL BE BONDED TO THE BEARING SEAT WITH AN APPROVED EPOXY ADHESIVE.

BEARING DESIGN TABLE SERVICE 1 LIMIT STATE	
DEAD LOAD REACTION	113.72 KIPS
LIVE LOAD REACTION (W/O IMPACT)	40.23 KIPS
UNLOADED HEIGHT	4.02 INCHES
LOADED HEIGHT (DL)	4.01
SHEAR MODULUS AT 73°	165 PSI



SECTION A -

SCALE: NTS



SECTION B -

SCALE: NTS

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VILLAGE

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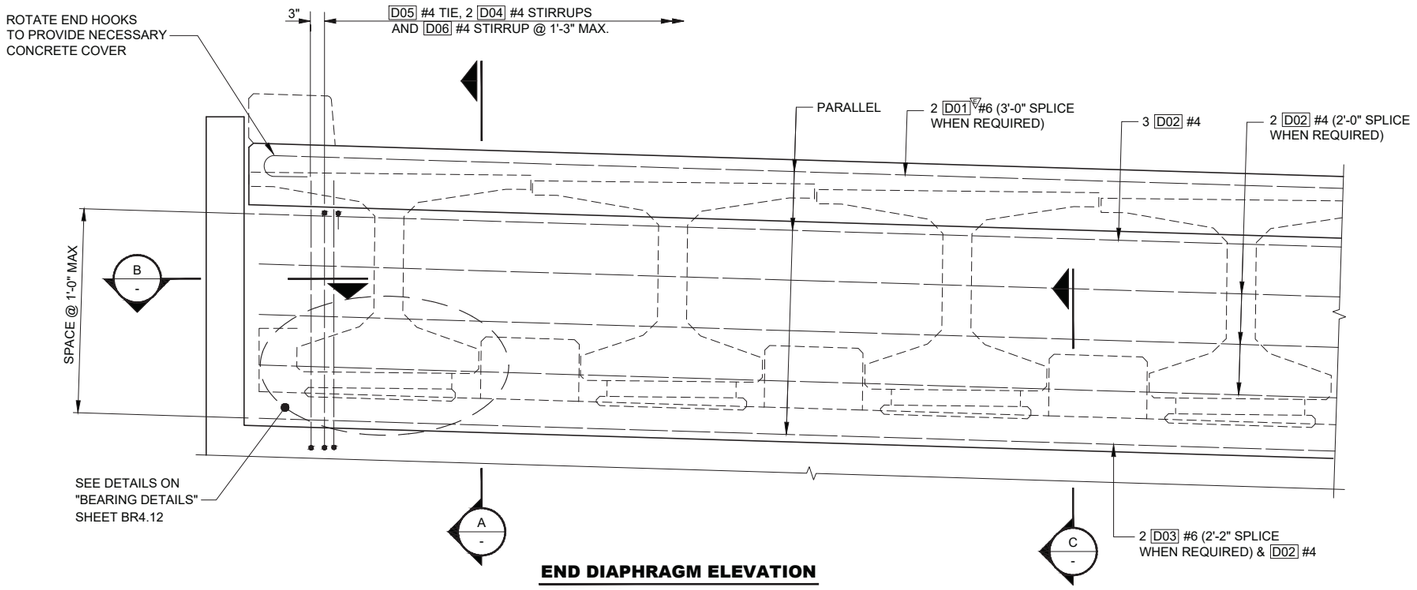
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DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

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ELASTOMERIC BEARING & GROUT PAD

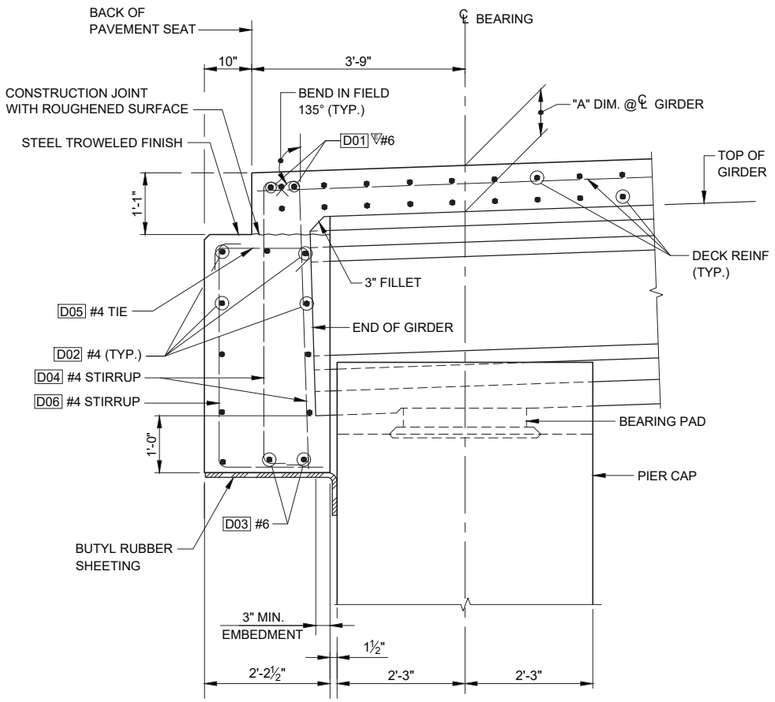
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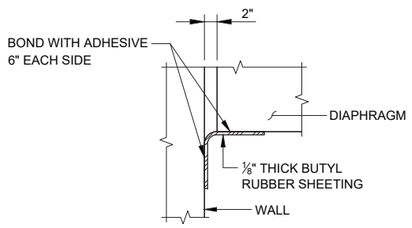
END DIAPHRAGM ELEVATION

SCALE: NTS
DIMENSIONS ARE ALONG ℄ DIAPHRAGM



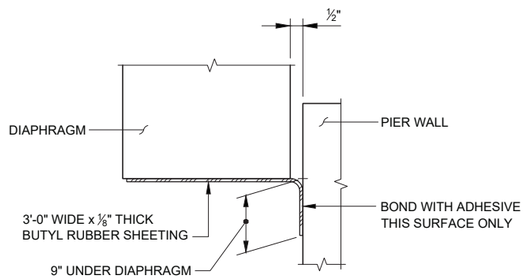
SECTION A

SCALE: NTS
SEE GIRDER SHEETS FOR DIM "A"
ALL LONGITUDINAL DIMENSIONS ARE NORMAL TO PIER WALL



SECTION B

SCALE: NTS



SECTION C

SCALE: NTS

NOTES:

1. GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED.
2. CUT/RELEASE GIRDER TEMPORARY STRANDS BEFORE CASTING DIAPHRAGM. SEE TEMPORARY STRAND CUTTING SEQUENCE.
3. EXTENDED STRANDS AND GIRDER REINFORCING NOT SHOWN FOR CLARITY.

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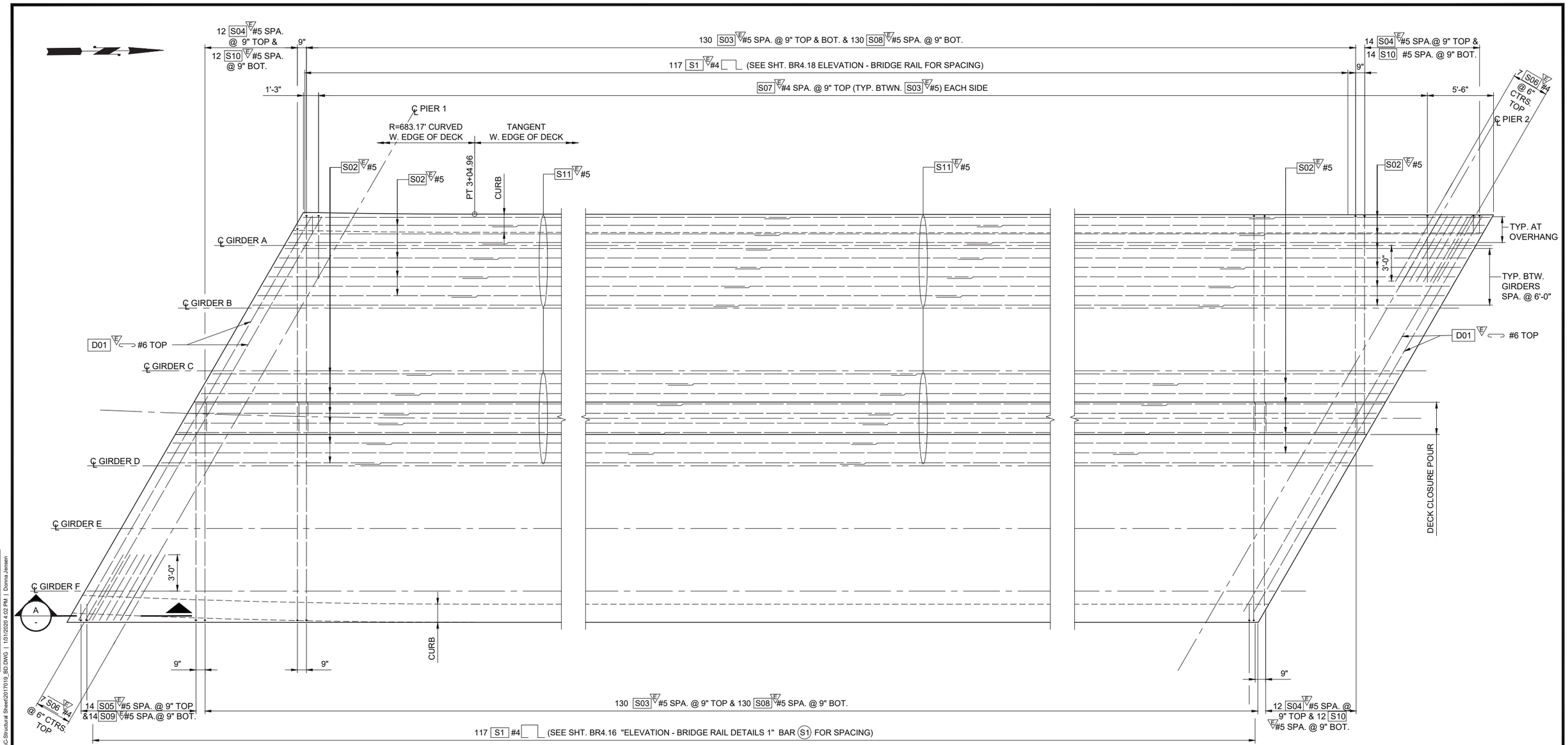
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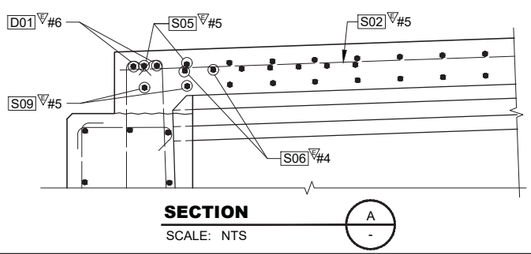
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END DIAPHRAGM DETAILS

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SHEET NO: 41 OF 61

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SECTION A
SCALE: NTS

DECK REINFORCING PLAN
SCALE: NTS

NOTE:
FOR EDGE OF DECK LAYOUT, SEE "BRIDGE FRAMING PLAN SHEET.

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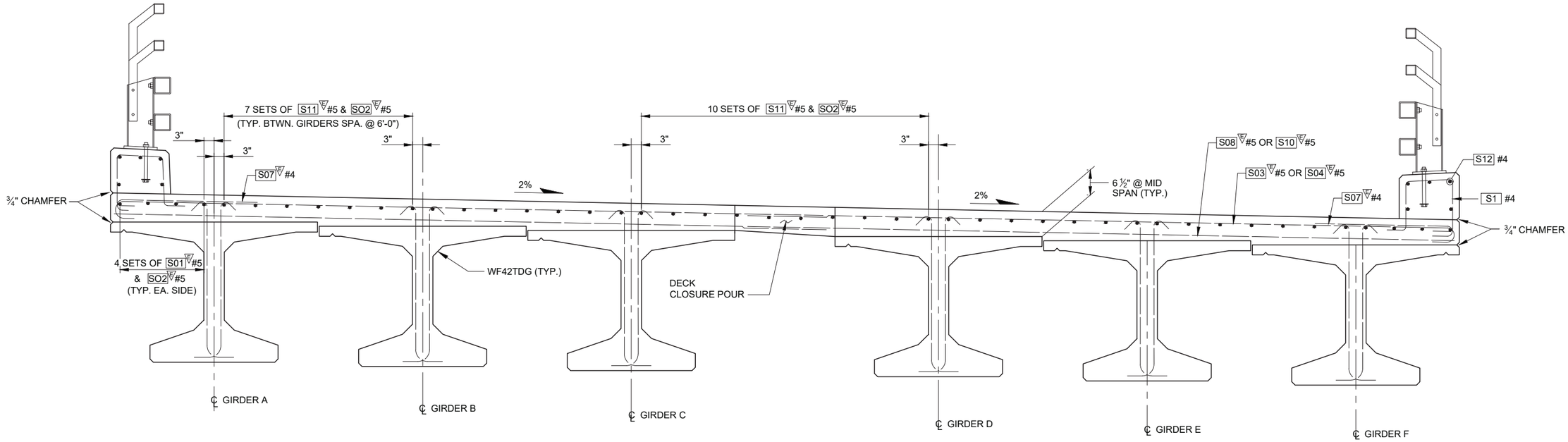
DESIGNED: S. SHIH	DRAWN: D. JENSEN		
DESIGNED:	DRAWN:		
DESIGNED:	CHECKED: J. KING		
SCALE: AS SHOWN	APPROVED: C. AVOLIO		

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BRIDGE DECK REINFORCEMENT PLAN

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
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DECK REINFORCING SECTION

SCALE: NTS

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DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
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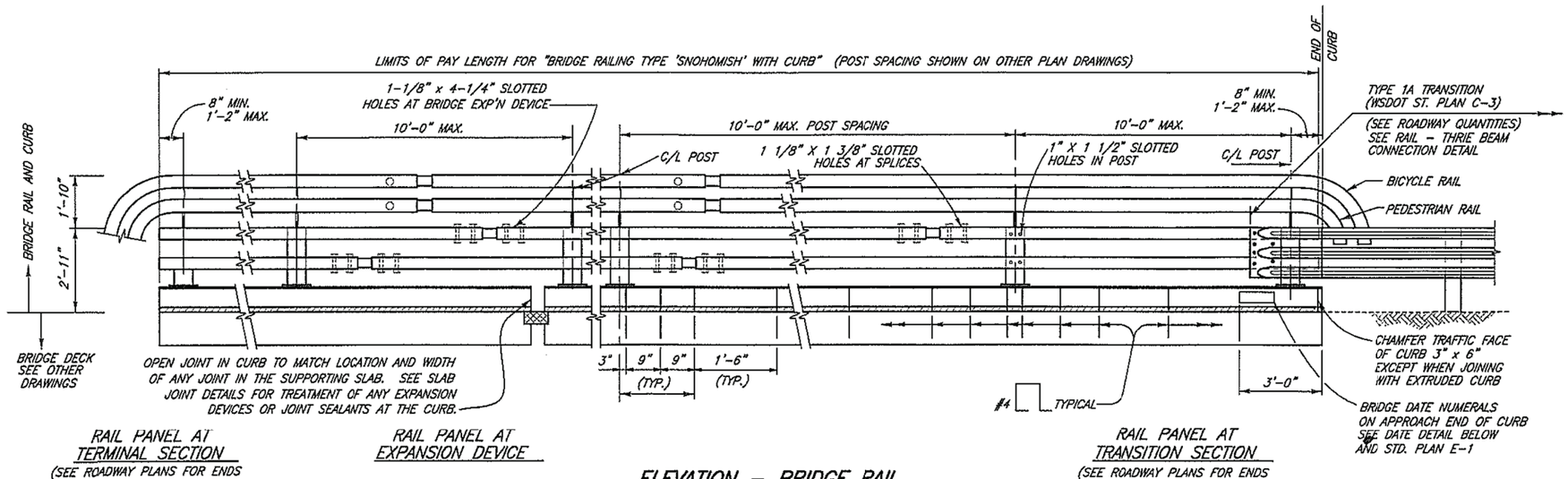
BRIDGE DECK REINFORCEMENT DETAILS

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RAIL PANEL AT TERMINAL SECTION
(SEE ROADWAY PLANS FOR ENDS NOT ATTACHED TO GUARD RAIL.)

RAIL PANEL AT EXPANSION DEVICE

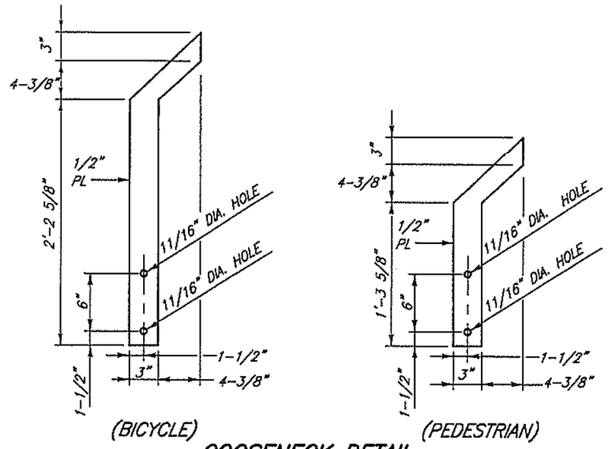
ELEVATION - BRIDGE RAIL

RAIL PANEL AT TRANSITION SECTION
(SEE ROADWAY PLANS FOR ENDS REQUIRING ATTACHMENT TO GUARD RAIL.)

NARRATIVE:

THE SNOHOMISH FOUR-TUBE RAIL WITH CURB WAS DEVELOPED TO MEET THE REQUIREMENTS OF SECTION 13, RAILINGS, OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 1998, 2nd EDITION WITH THE 2000 INTERIM REVISIONS.

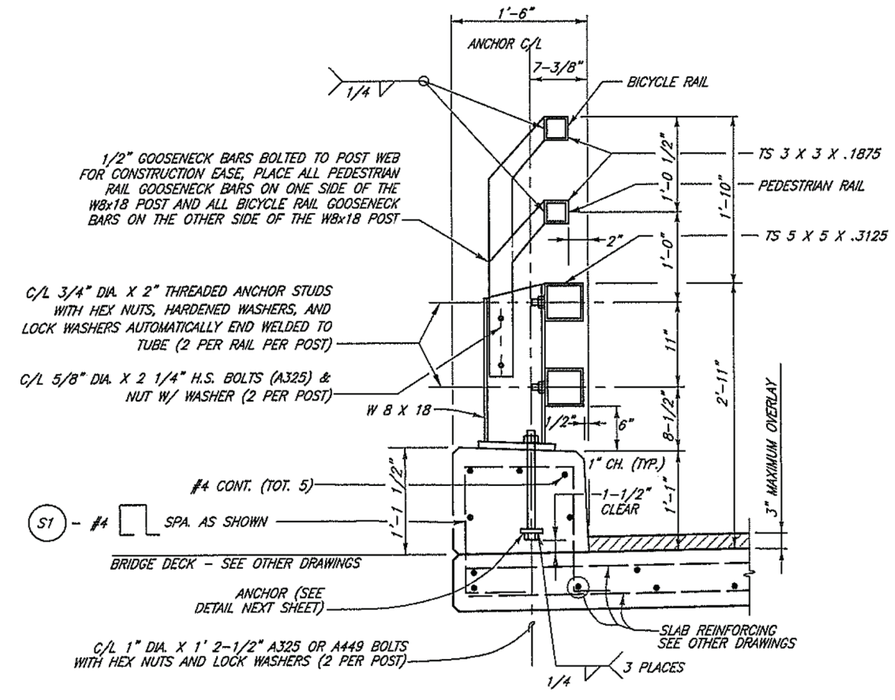
THIS RAIL DESIGN WAS ACCEPTED BY THE FHWA IN JULY 2002 AS A NCHRP REPORT 350 TEST LEVEL 4 (TL-4) DESIGN. THIS DESIGN MODIFIED THE TL-4 APPROVED COLORADO D.O.T. "BRIDGE RAIL TYPE 10" AND ADDED THE TWO SMALLER RAILS FOR PEDESTRIAN AND BICYCLE PROTECTION.



(BICYCLE) (PEDESTRIAN)

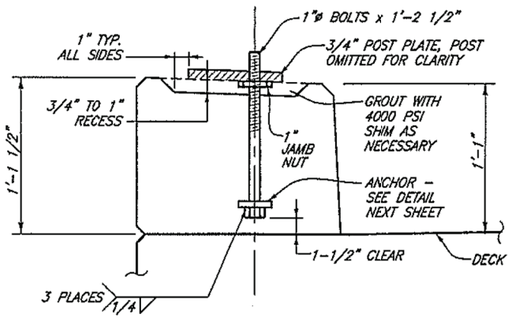
GOOSENECK DETAIL

MATERIAL SHALL BE ASTM A-572 GRADE 50
(1 EACH REQUIRED PER W8 POST)

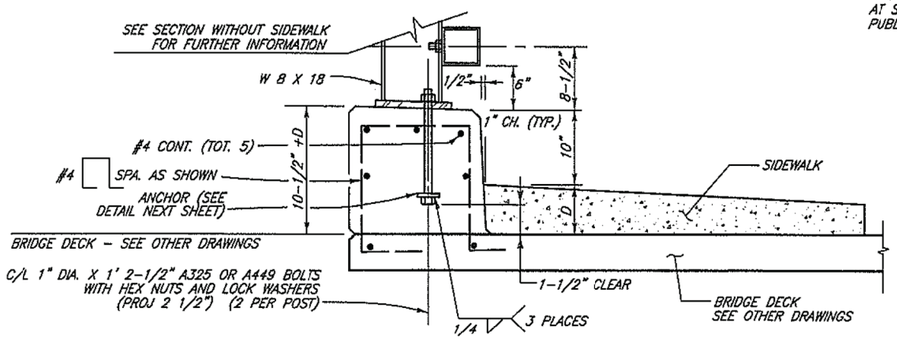


SECTION - WITHOUT SIDEWALK

USE ONLY WHEN OTHER CONTRACT DRAWINGS SHOW NO SIDEWALK



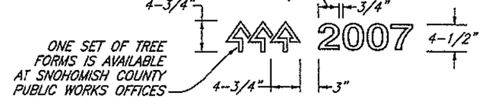
OPTIONAL - CURB RECESS DETAIL



D = SIDEWALK DEPTH OF CURB

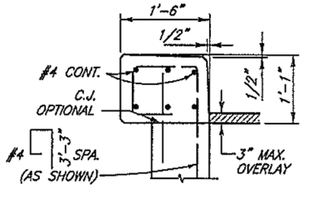
SECTION - WITH SIDEWALK

USE ONLY WHEN OTHER CONTRACT DRAWINGS SHOW SIDEWALK



DATE DETAIL

SEE WSDOT STD. PLAN E-1
(PROVIDE YEAR THAT BRIDGE IS COMPLETED)



SECTION

USE WHEN CURB IS PLACED ON TOP OF A WALL AS SHOWN ON OTHER CONTRACT DRAWINGS

GENERAL NOTES:

1. FOR ABBREVIATIONS AND LEGEND, SEE DWGS. G1.01 AND G1.02.

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\\BHM-SRVR-01\Bellingham Projects\2017\2017019 - Stillaguamish Kackman Creek Culverts\000 CAD\010 Drawing\C-Structural Sheet\2017019_B03.dwg | 1/31/2020 9:12 AM | Donna Jensen

100% DESIGN - BID SET

No.	REVISION	BY	APP'D	DATE

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

STILLAGUAMISH stulǝgʷa'bš VILLAGE

HERRERA

D. "CHI S" SHIH — STATE OF WASHINGTON — 25583 — REGISTERED PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN
DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

BRIDGE RAIL DETAILS 1

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	BR4.16
SHEET NO:	44 OF 61

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NOTES:

MATERIALS:
ALL TUBES SHALL BE ASTM A-500 GRADE B.
ALL POSTS AND BASE PLATES SHALL BE ASTM A-572 GRADE 50.
ALL OTHER STEEL SHALL BE ASTM A-36 UNLESS OTHERWISE NOTED.
PORTLAND CEMENT CONCRETE FOR THE CURB SHALL BE CLASS 4000 D.
ALL BOLTS SHALL BE ASTM A325 UNLESS OTHERWISE NOTED.
ALL CURB REINFORCING STEEL SHALL BE GRADE 60 AND HOT DIP GALVANIZED COATED.

THIS BRIDGE RAILING SHALL BE CONSTRUCTED IN ACCORDANCE WITH W.S.D.O.T. STANDARD SPEC. SECTION 6-06.

THE TUBES SHALL BE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE WHEN RADIUS IS LESS THAN 1,500 FEET.

TUBES SHALL BE CONTINUOUS OVER NOT LESS THAN TWO POSTS. NO WELDED BUTT SPLICES WILL BE ALLOWED IN THE TUBE SECTIONS.

THE CENTERLINE OF THE TUBE SPLICE SHALL BE 1'-8" MINIMUM AND 2'-6" MAXIMUM FROM THE CENTERLINE OF THE POSTS.

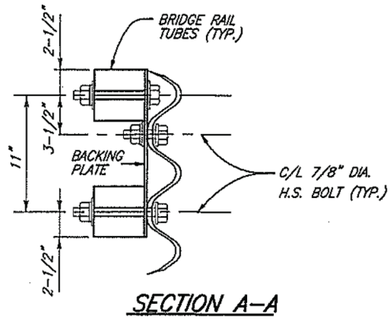
ALL BOLTS THAT HAVE LOCK WASHERS SHALL BE TIGHTENED TO SNUG ONLY.

ONE OR MORE 10'-0" POST SPACINGS MAY BE REDUCED (6'-8" MIN.) IN ORDER TO MAINTAIN DIMENSIONS FROM THE END OF THE RAIL AND EXPANSION JOINTS.

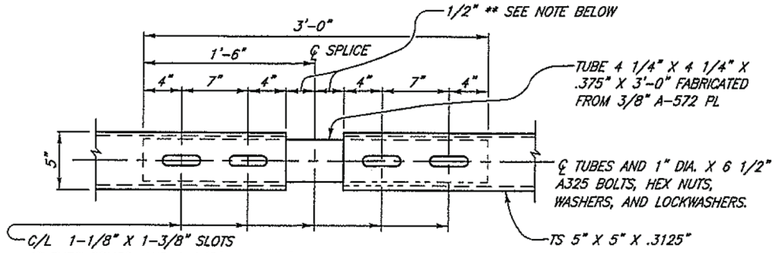
PAYMENT WILL BE MADE UNDER "BRIDGE RAILING TYPE 'SNOHOMISH' WITH CURB" FOR ALL POSTS, POST ANCHORS, BASE PLATES, BACKING PLATES, ANCHOR BOLTS, MISCELLANEOUS BOLTS, NUTS, WASHERS, TUBES, TUBE EXPANSION DEVICES, TUBE SPLICES, END PLATES, CURB CONCRETE (CLASS 4000), CURB REINFORCING STEEL, GALVANIZING, FABRICATION, AND INSTALLATION. IF THERE IS NO PAY ITEM IN THE PROPOSAL FOR "BRIDGE RAILING TYPE 'SNOHOMISH' WITH CURB," THE PAYMENT SHALL BE INCIDENTAL TO THE BRIDGE SUPERSTRUCTURE PAY ITEM.

RAILING SHALL BE FABRICATED TO THE HORIZONTAL AND VERTICAL ALIGNMENT OF THE STRUCTURE. POSTS SHALL BE NORMAL TO GRADE AND PLUMB IN SECTION.

ALL STRUCTURAL STEEL INCLUDING FASTENERS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION, EXCEPT AS NOTED. GALVANIZED-CONTROL SILICON MEANS SILICON CONTENT OF 0.0% TO 0.06% (PREFERABLY 0.0% TO 0.04%) OR 0.15% TO 0.28% (PREFERABLY 0.15% TO 0.25%).

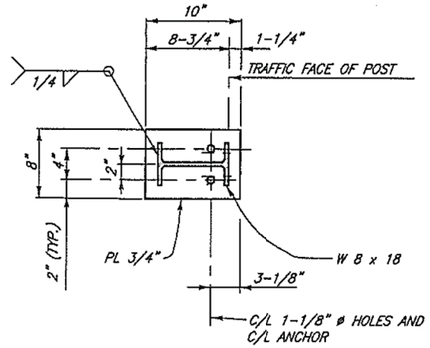


SECTION A-A

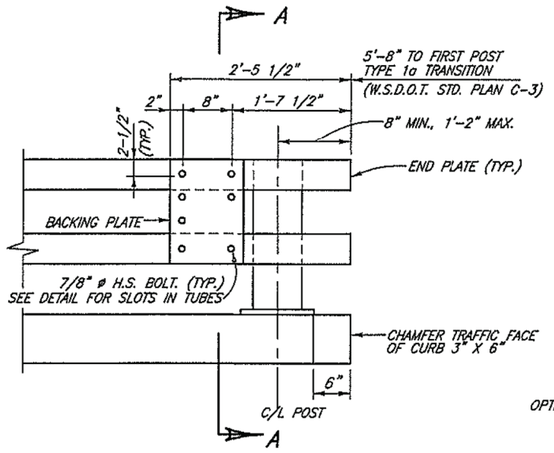


** NOTE: ENGINEER TO VERIFY THIS DIMENSION AT THE EXPANSION JOINTS OF LARGER SPAN BRIDGES (3" MAX.)

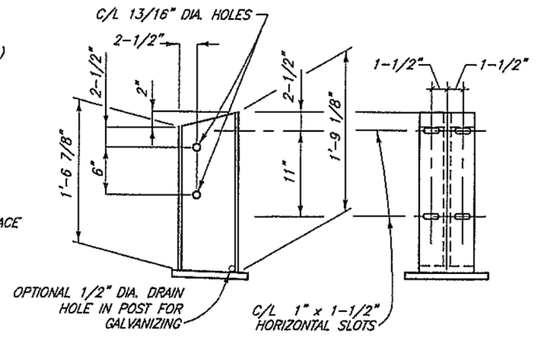
PLAN - TUBE SPLICE



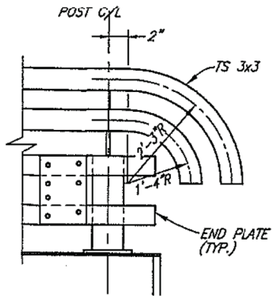
PLAN - POST DETAIL



RAIL-THRIE BEAM CONNECTION DETAIL

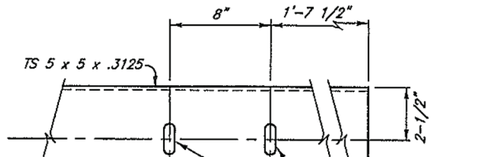


ELEVATION



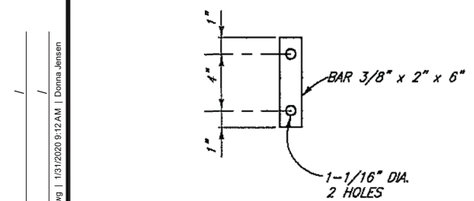
FRONT

BIKE/PEDESTRIAN RAIL END DETAIL



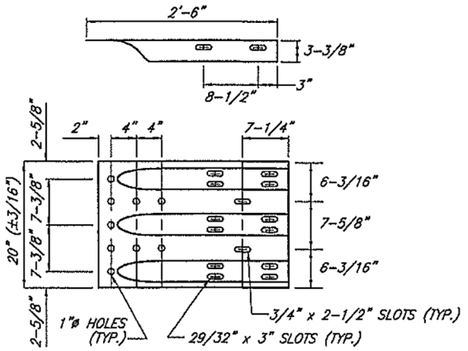
SLOT DETAIL

SLOTS AT END OF RAIL ARE REQUIRED TO ATTACH BACKING PLATE AND THRIE BEAM



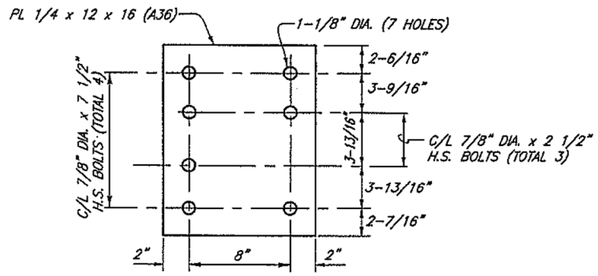
MATERIAL SHALL BE ASTM A-36 STEEL (1 PER POST)

ANCHOR DETAIL



THRIE BEAM END SECTION

(NOTE: STD. PLAN C-7a DESIGN F HAS BEEN MODIFIED BY MAKING ALL ROUND HOLES 1" DIAMETER)



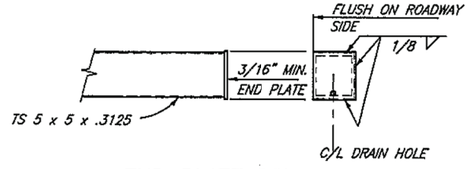
BACKING PLATE

(NOTE: ALL BOLTS FOR BACKING PLATE SHALL HAVE HEXNUTS, 2 PL WASHERS, AND 1 LOCK WASHER)

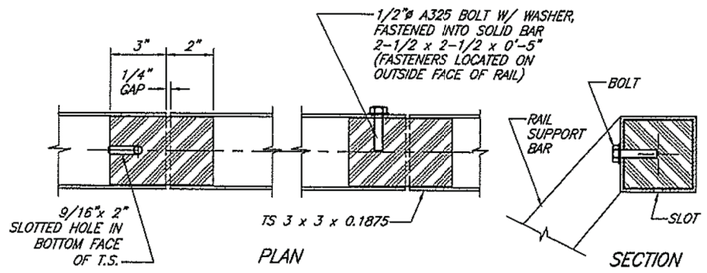
INFORMATION ONLY		
DESCRIPTION	UNIT	PER LIN. FT.
STRUCTURAL STEEL (GALV.)	LB.	69.10
CONCRETE CLASS 4000D	C.Y	.06
ST. REINFORCING BAR (GALV.)	LB.	6.60

THE FOUR-TUBE RAIL WITH 13-INCH CURB WEIGHS 320 LBS. PER FOOT OF LENGTH.

NOTE: IF MOVEMENT AT THE EXPANSION JOINT IS GREATER THAN 1", THEN THE ENGINEER OF RECORD SHALL MAKE NOTE OF THE INCREASED OPENING OF THE TUBE RAIL IN THE CONTRACT DOCUMENTS AT THE EXPANSION JOINT. SEE PLAN-TUBE SPLICE. (THIS APPLIES TO CONCRETE BRIDGES GREATER THAN 400-FEET IN LENGTH, ANY SKEW BRIDGES OR STEEL BRIDGES).



END PLATE DETAIL



HANDRAIL SPLICE DETAIL

GENERAL NOTES:

1. FOR ABBREVIATIONS AND LEGEND, SEE DWGS. G1.01 AND G1.02.

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STILLAGUAMISH stuləgʷaʔbš VILLAGE

HERRERA

PE CHI S. SIH — STATE OF WASHINGTON — 25583 — REGISTERED PROFESSIONAL ENGINEER — 2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN		
DESIGNED:	DRAWN:		
DESIGNED:	CHECKED: J. KING		
SCALE: AS SHOWN	APPROVED: C. AVOLIO		

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

BRIDGE RAIL DETAILS 2

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: BR4.17
SHEET NO: 45 OF 61

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S = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES

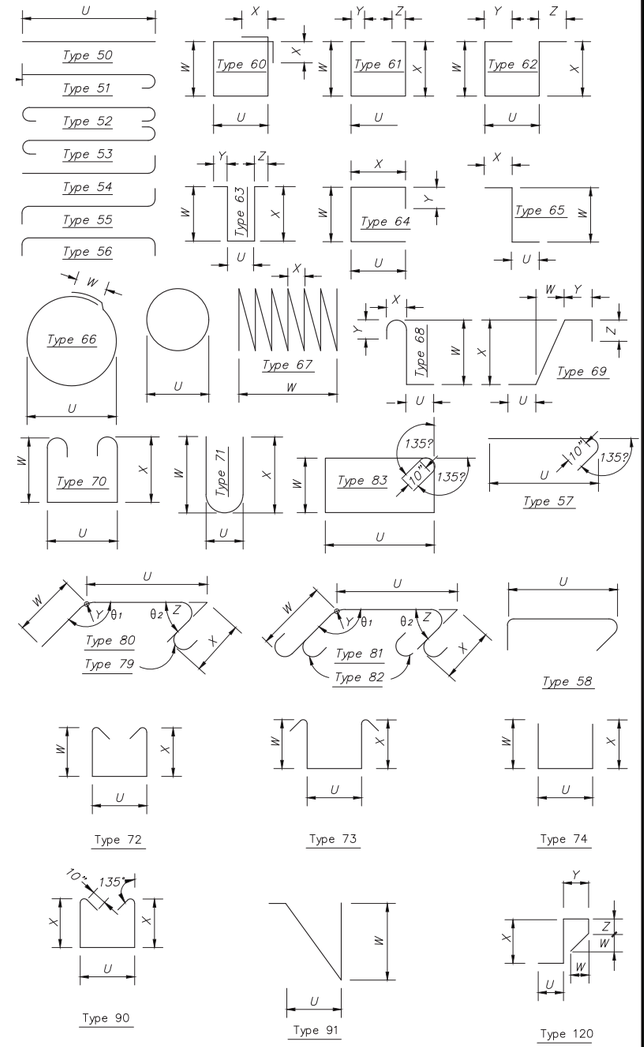
T = TIE OR STIRRUP

E = BAR IS TO BE EPOXY COATED

DIMENSIONS (OUT TO OUT)

MARK	DESCRIPTION	SIZE	NUM	BEND	TIE	SUBS	EPOXY	VARIES	# EA	U	W	X	Y	Z	Θ1	Θ2	LENGTH	
#			REQD							FT	FT	FT	FT	FT	DEG	DEG	FT	IN
CURTIAN WALLS																		
C01	VERT	5	12	50						5.98							5	11
C02	LONGIT	4	42	50						4.53							4	7
C03	LONGIT	5	24	80						1.83	1.00			0	150		2	10
C04	LONGIT	5	3	50						10.92	0.83	0.33					12	1
C05	VERT	5	12	50						5.98							5	11
C06	VERT	5	12	50						5.47							5	5
C07	VERT	5	12	50						5.48							5	5
C08	LONGIT	5	24	80						1.17	1.00			0	150		2	2
C09	LONGIT	4	2	50						10.40							10	5
C10	VERT	6	12	50						4.00							4	0
C11	LONGIT	4	3	80						10.00	1.25			0	120		11	3
C12	LONGIT	4	3	80						10.00	1.25			0	120		11	3
PIER 1 PILE CAP																		
A01	TOP LONGIT	5	5	50		S				41.06							41	1
A02	BOT LONGIT	5	5	50		S				41.063							41	1
A03	SIDE LONGIT	5	6	50		S				41.06							41	1
A04	TIE	5	56	58	T	S		V		3.27							3	3
		5	56					V		3.71							3	9
A05	TIE	5	28	58	T	S				4.05							4	1
A06	TIE	5	56	72	T	S		V		3.27	4.05	0.50			90	45	7	7
		5	56					V		3.71	4.05	0.50			90	45	8	9
A07	SITRRUP	5	28	58		S				3.71							3	1
A08	VERT	6	11	50		S				3.25							3	3
A09	VERT	4	11	50		S				3.25							3	3
A10	LONGIT	4	6	50		S				9.50							9	6
A11	GIR STOP	5	36	74		S				0.563	2.21	2.21					4	11
A12	GIR STOP	5	48	74		S				1.67	0.67	0.67					3	0
PIER 2 PILE CAP																		
A01	TOP LONGIT	5	5	50		S				41.06							41	1
A02	BOT LONGIT	5	5	50		S				41.06							41	1
A03	SIDE LONGIT	5	6	50		S				41.06							41	1
A04	TIE	5	56	58	T	S		V		3.27							3	3
		5	56					V		3.71							3	9
A05	TIE	5	28	58	T	S				4.05							4	1
A06	TIE	5	56	72		S		V		3.27	4.05	0.50			90	45	7	7
		5	56					V		3.71	4.05	0.50			95	45	8	9
A07	SITRRUP	5	28	58		S				3.71							3	1
A08	VERT	6	11	50		S				3.25							3	3
A09	VERT	4	11	50		S				3.25							3	3
A10	LONGIT	4	6	50		S				9.50							9	6
A11	GIR STOP	5	36	74		S				0.563	2.21	2.21					4	11
A12	GIR STOP	5	48	74		S				1.67	0.67	0.67					3	0
END DIAPHRAM																		
D01	TOP LONGIT	6	4	52						33.33							33	4
D02	SIDE LONGIT	4	20	50						33.33							33	4
D03	BOT LONGIT	6	4	50						33.33							33	4
D04	STIRRUP	4	108	58						4.96							4	11
D05	TIE	4	54	58	T					2.21							2	3
D06	STIRRUP	4	54	80						3.92	1.88	0.50			90	90	6	4
PIER 1 & 2 SHAFTS																		
P01	LONGIT	8	72	50		S				81.50							81	6
P02	SPIRAL	4	12	67		S				1.67	81.50	0.50					83	8
P03	SPIRAL	4	12	67		S				1.67	2.83	0.50					5	0
DECK																		
S1	BARRIER	4	234	62	T					1.25	1.08	1.08	0.58	0.58			4	7
S02	LONGIT	5	44	50			E			21.00							21	0
S03	TOP TRANSV	5	130	52			E			33.67							33	8
S04	TOP TRANSV	5	12	52			E	V		32.37							32	4
		5	12							18.08							18	1
S05	TOP TRANSV	5	14	52			E	V		16.78							16	9
		5	14							2.49							2	6
S06	LONGIT	4	14	51			E			6.45							6	6
S07	TOP TRANSV	4	173	51			E			3.50							3	6
		4	173	51			E			3.50							3	6
S08	BOT TRANSV	5	130	50			E			33.67							33	8
S09	BOT TRANSV	5	14	50			E	V		16.78							16	9
		5	14							2.49							2	6
S10	BOT TRANSV	5	12	50			E	V		32.37							32	4
		5	12							18.08							18	1
S11	LONGIT	5	88	50			E			50.00							50	0
S12	BARRIER	4	10	62						110.00							110	7
D01	LONGIT	6	4	50			E			33.67							33	8

REINFORCEMENT BENDING DIAGRAMS



REINFORCEMENT NOTES

1. ALL REINFORCING BARS ON THIS SHEET SHALL BE A.S.T.M. A-615. GRADE 60 UNLESS SHOWN OTHERWISE.

TRANTECH Engineering LLC
1221 FRASER ST; SUITE E-3 I BELLINGHAM, WA 98229

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\\BHM-SRVR-01\Bellingham Projects\2017\2017019 - Stillguamish Kackman Creek Culverts\000 CAD\010 Drawing\C-Structural Sheet\2017019_BD.DWG | 1/31/2020 4:19 PM | Donna Jensen

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No.	REVISION	BY	APP'D	DATE

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STILLAGUAMISH stuləgʷaʔbš VILLAGE

HERRERA

PE-CHI S. SHIH — STATE OF WASHINGTON — 25583 — REGISTERED PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN		
DESIGNED:	DRAWN:		
DESIGNED:	CHECKED: J. KING		
SCALE: AS SHOWN	APPROVED: C. AVOLIO		

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

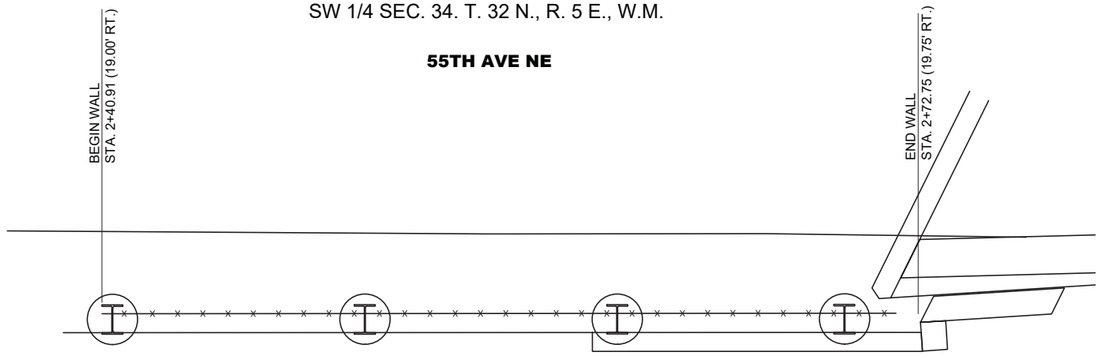
BRIDGE BAR LIST

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: BR4.18
SHEET NO: 46 OF 61

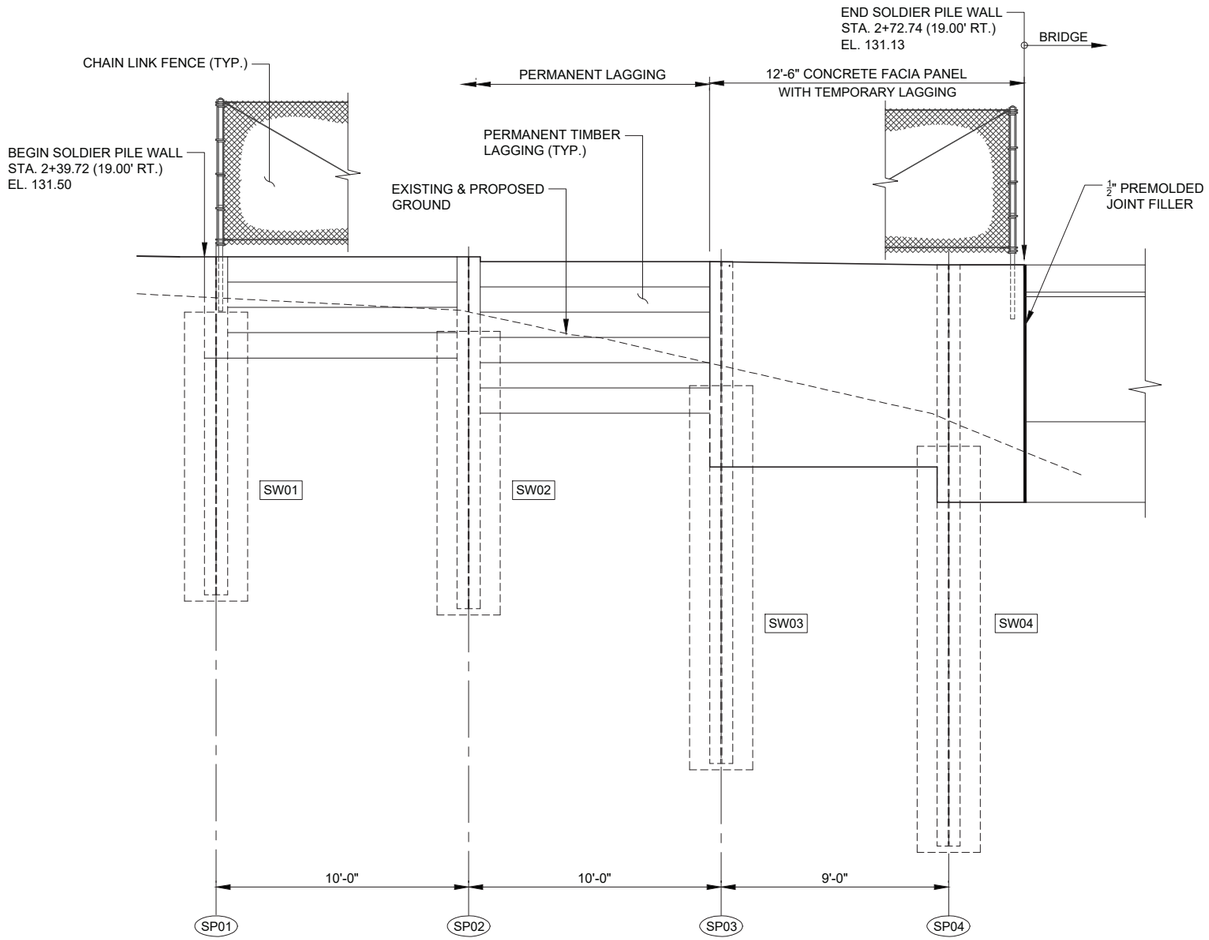
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SW 1/4 SEC. 34. T. 32 N., R. 5 E., W.M.

55TH AVE NE



PLAN - SOUTH WALL



ELEVATION - SE WALL

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BACK-CHECKED BY: / DATE: /
\\BHM-SRVR-01\Bellingham Projects\2017\2017019 - Stillguamish Kackman Creek Culverts\000 CAD\010 Drawing\C-Structural Sheet\2017019_S-01.DWG | 1/31/2020 4:07 PM | Donna Jensen

100% DESIGN - BID SET

No.	REVISION	BY	APP'D	DATE

ONE INCH
AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

STILLAGUAMISH
stulǝgʷaʔbš
VILLAGE

HERRERA

DEZ CHRIS SMITH
STATE OF WASHINGTON
25583
REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

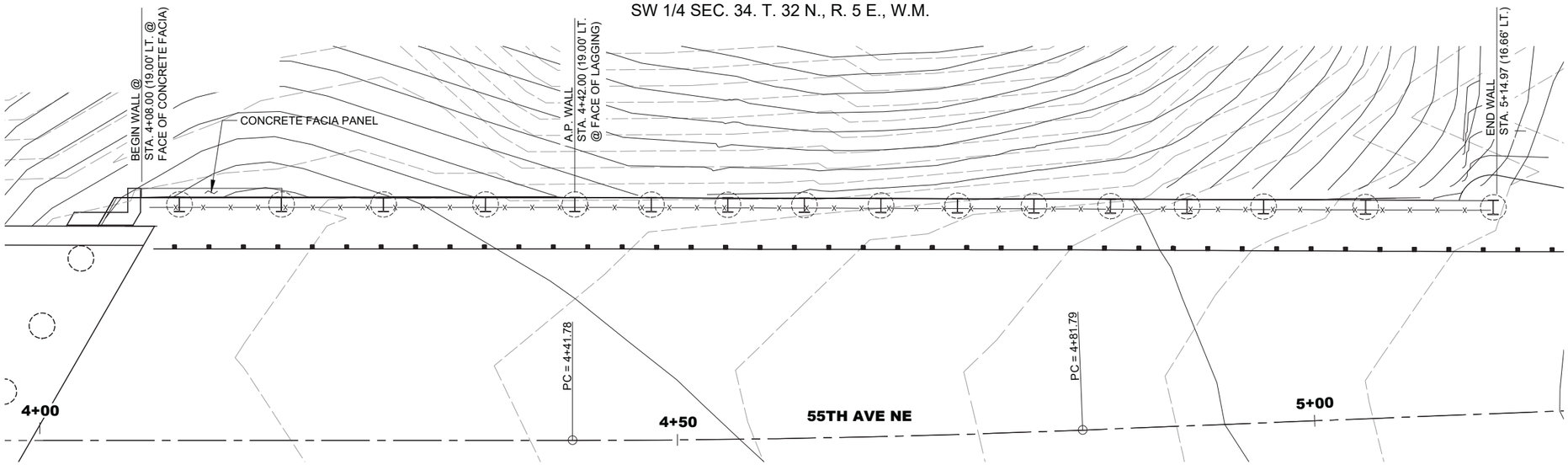
DESIGNED: S. SHIH	DRAWN: D.JENSEN
DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE
CULVERT REPLACEMENT
SNO CTY PFN# 19-112866 D5

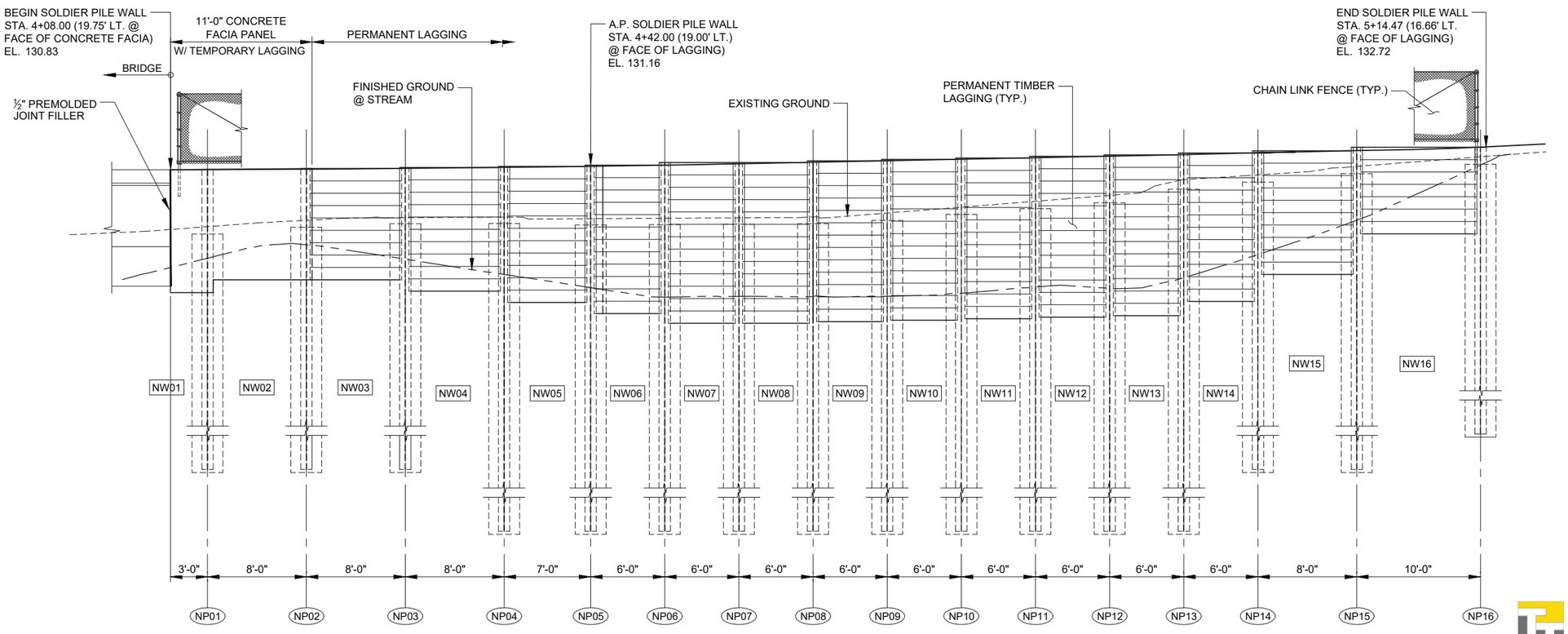
RETAINING WALL PLAN & ELEVATION - SOUTH WALL

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: WL1.01
SHEET NO: 47 OF 61

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PLAN - NORTH WALL



ELEVATION - NW WALL

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1221 FRASER ST; SUITE E-3 I BELLINGHAM, WA 98229

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ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

STILLAGUAMISH stulǝgʷa'bš VILLAGE

HERRERA

P.E. CHI S. SHIH — STATE OF WASHINGTON — 25583 — REGISTERED PROFESSIONAL ENGINEER
2/3/2020

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DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

RETAINING WALL PLAN & ELEVATION - NORTH WALL

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: WL1.02
SHEET NO: 48 OF 61

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\\BHM-SRVR-01\Bellingham Projects\2017\2017019 - Stillaguamish Kackman Creek Culverts\000 CAD\010 Drawing\C-Structural Sheet\2017019_S-01.DWG | 1/31/2020 4:10 PM | Donna Jensen

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SOLDIER PILE SCHEDULE

Pile Number	55th Ave NE Station	55th Ave NE Offset	Section Type	Design Height	Depth of Embedment	Top of Pile Elev.	Bottom of Pile Elev.	Pile Length
SP01	2+41.19	18.46' R	W14X30	4.00	28	131.50	99.50	32.00
SP02	2+51.07	18.40' R	W14X30	4.00	28	131.40	99.40	32.00
SP03	2+61.07	18.35' R	W14X30	6.00	28	131.30	96.30	35.00
SP04	2+69.84	18.41' R	W14X30	8.00	26	131.20	97.20	34.00
NP01	4+10.96	18.49' L	W14X30	9.00	22	130.89	99.89	31.00
NP02	4+18.96	18.49' L	W14X48	8.00	24	130.92	98.92	32.00
NP03	4+26.96	18.49' L	W14X48	9.00	22	130.99	99.99	31.00
NP04	4+34.96	18.48' L	W14X53	11.00	22	131.08	98.08	33.00
NP05	4+41.78	18.48' L	W14X61	12.00	22	131.16	97.16	34.00
NP06	4+48.07	18.26' L	W14X68	13.00	22	131.26	96.26	35.00
NP07	4+54.18	18.18' L	W14X68	13.00	22	131.37	96.37	35.00
NP08	4+60.29	18.07' L	W14X68	13.00	22	131.48	96.48	35.00
NP09	4+66.40	17.92' L	W14X68	13.00	22	131.61	96.61	35.00
NP10	4+72.51	17.73' L	W14X68	13.00	22	131.73	96.73	35.00
NP11	4+78.61	17.51' L	W14X68	12.00	22	131.85	97.85	34.00
NP12	4+84.66	17.26' L	W14X68	13.00	22	131.98	96.98	35.00
NP13	4+90.65	17.00' L	W14X68	12.00	22	132.10	98.10	34.00
NP14	4+96.66	16.93' L	W14X53	10.00	24	132.25	98.25	34.00
NP15	5+04.65	16.58' L	W14X34	8.00	26	132.43	98.43	34.00
NP16	5+14.64	16.16' L	W14X30	5.00	29	132.72	99.72	33.00

WALL SCHEDULE

Wall Panel Number	Lagging size	Bottom of Lagging Elev.	Top of Lagging Elev.
SW01	4X12	127.75	131.59
SW02	4X12	125.40	131.41
SW03	4X12	123.28	131.28
SW04	-	121.88	131.28
NW01	-	120.96	130.88
NW02	4X12	121.99	130.88
NW03	6X12	121.62	130.99
NW04	6X12	120.76	131.07
NW05	6X12	119.90	131.15
NW06	6X12	119.06	131.25
NW07	6X12	118.36	131.48
NW08	6X12	118.36	131.48
NW09	6X12	118.48	131.60
NW10	6X12	118.60	131.72
NW11	6X12	118.71	131.84
NW12	6X12	118.85	131.97
NW13	6X12	118.97	132.09
NW14	6X12	120.05	132.24
NW15	4X12	122.11	132.42
NW16	4X12	125.20	132.70

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STILLAGUAMISH
stulǝgʷa'bš
VILLAGE

HERRERA

PE -CHI S SHIH
STATE OF WASHINGTON
25583
REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN		
DESIGNED:	DRAWN:		
DESIGNED:	CHECKED: J. KING		
SCALE: AS SHOWN	APPROVED: C. AVOLIO		

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

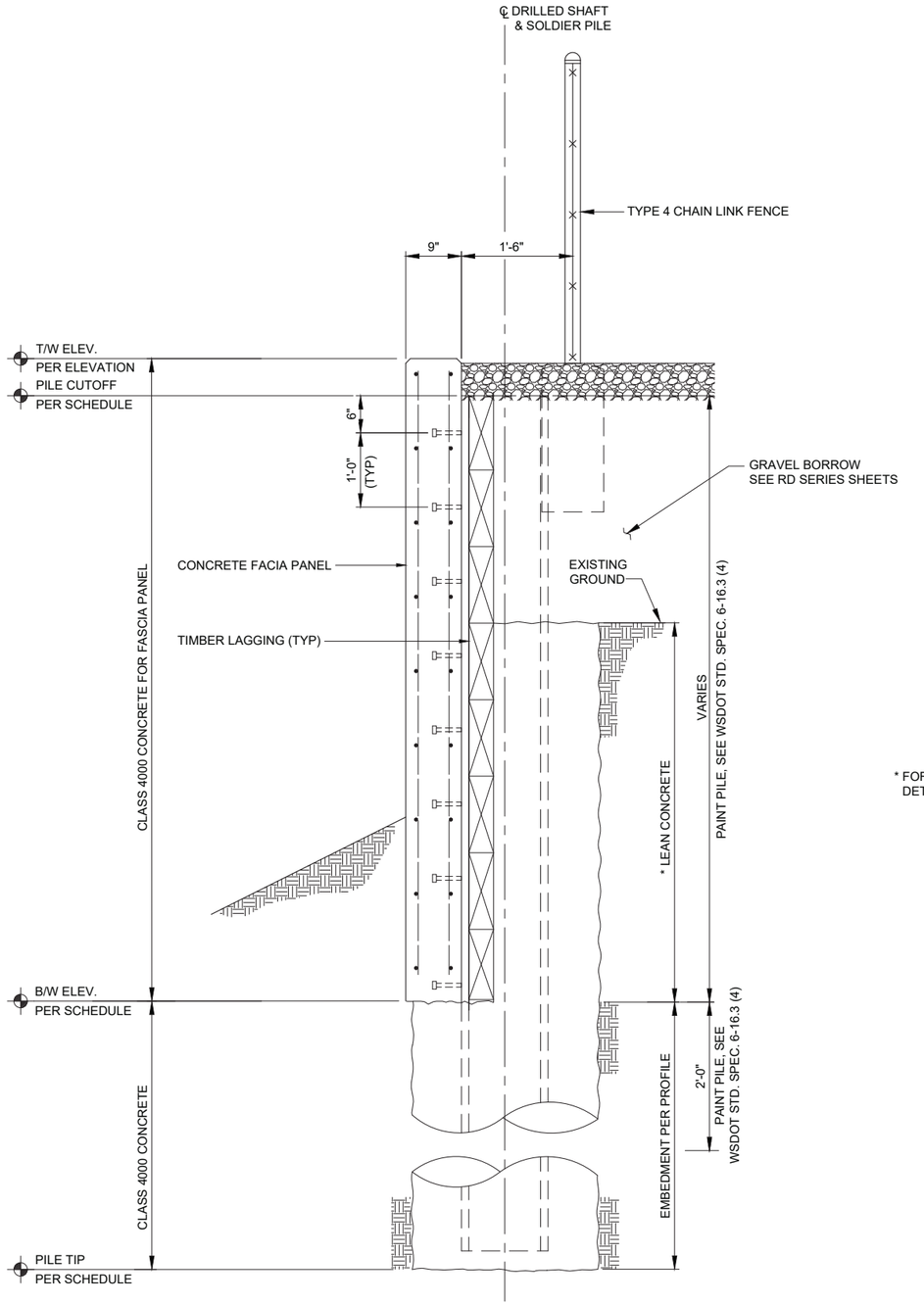
RETAINING WALL PANEL & SOLDIER PILE SCHEDULE

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: WL1.03
SHEET NO: 49 OF 61

TRANTECH Engineering LLC
1221 FRASER ST; SUITE E-3 I BELLINGHAM, WA 98229

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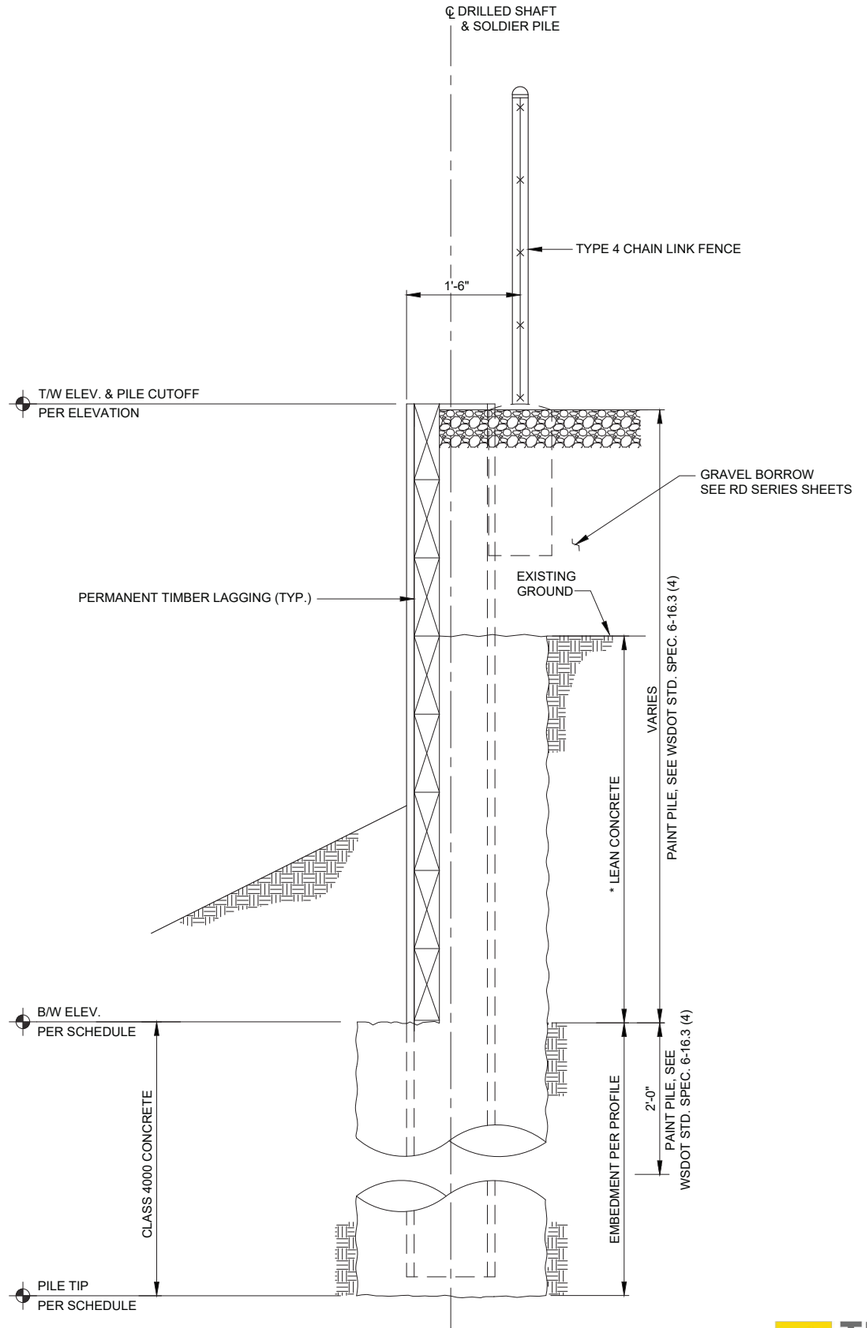
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TYPICAL WALL SECTION WITH CIP CONCRETE FACIA

SCALE: NTS

* FOR LEAN CONCRETE REMOVAL
DETAIL SEE DWG. WL3.01



TYPICAL WALL SECTION WITH TIMBER LAGGING ONLY

SCALE: NTS

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STILLAGUAMISH
stulǝgʷaʔbš
VILLAGE

HERRERA

PE CHI S SHIH
STATE OF WASHINGTON
25583
REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN	DATE: FEBRUARY 2020	
DESIGNED:	DRAWN:	PROJECT NO: 15-06057-005	
DESIGNED:	CHECKED: J. KING	DRAWING NO: WL2.01	
SCALE: AS SHOWN	APPROVED: C. AVOLIO	SHEET NO: 50 OF 61	

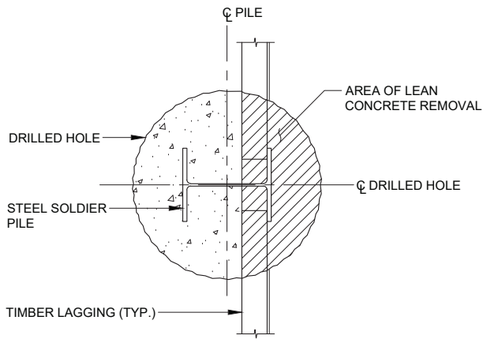
KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

RETAINING WALL SECTIONS

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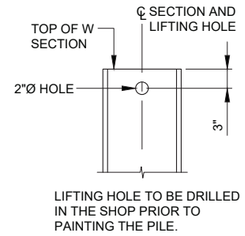
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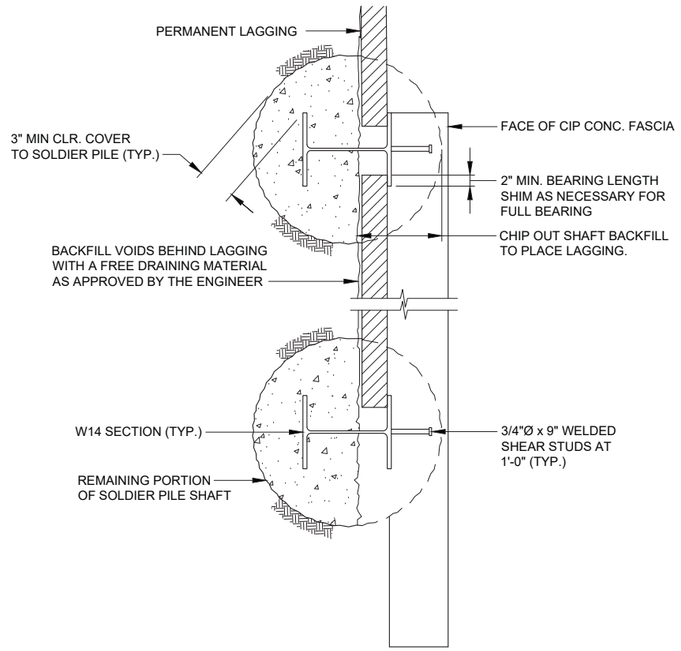
TYPICAL LEAN CONCRETE REMOVAL DETAIL

SCALE: NTS



SOLDIER PILE LIFTING HOLE

SCALE: NTS



TYPICAL SOLDIER PILE WALL WITH CIP CONCRETE FASCIA

SCALE: NTS

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No.	REVISION	BY	APP'D	DATE

ONE INCH
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STILLAGUAMISH
stulǝgʷa'bš
VILLAGE

HERRERA

P.E. CHI S. SHIH
STATE OF WASHINGTON
25583
REGISTERED
PROFESSIONAL ENGINEER
2/3/2020

DESIGNED: S. SHIH	DRAWN: D. JENSEN
DESIGNED:	DRAWN:
DESIGNED:	CHECKED: J. KING
SCALE: AS SHOWN	APPROVED: C. AVOLIO

KACKMAN CREEK 55TH AVE NE CULVERT REPLACEMENT SNO CTY PFN# 19-112866 D5

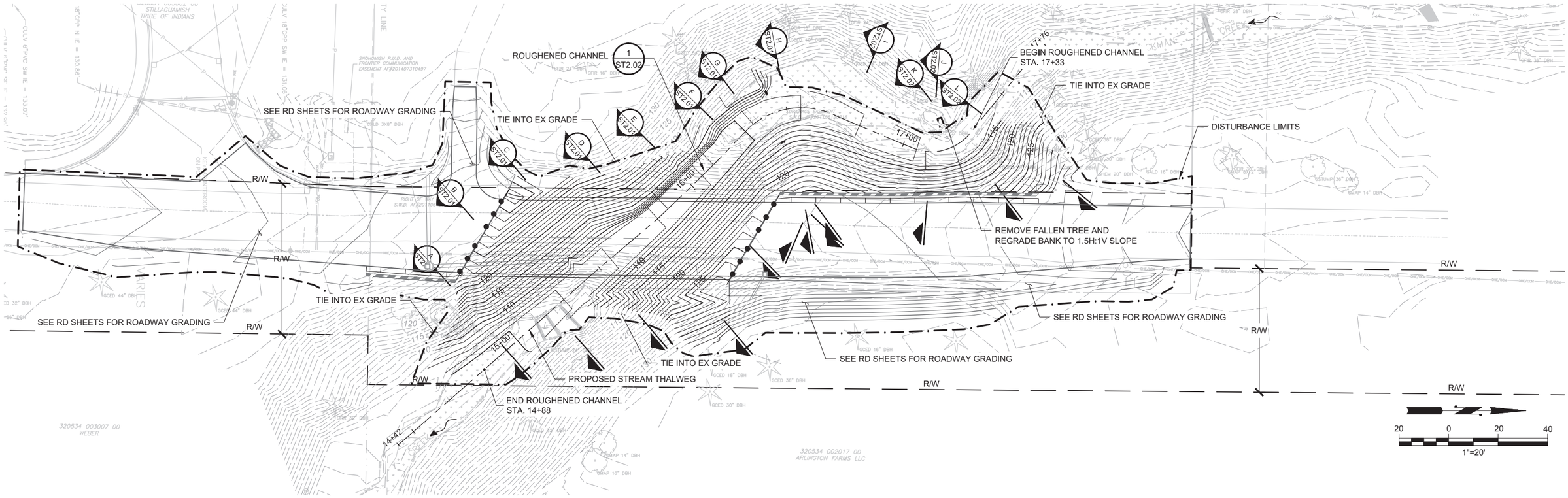
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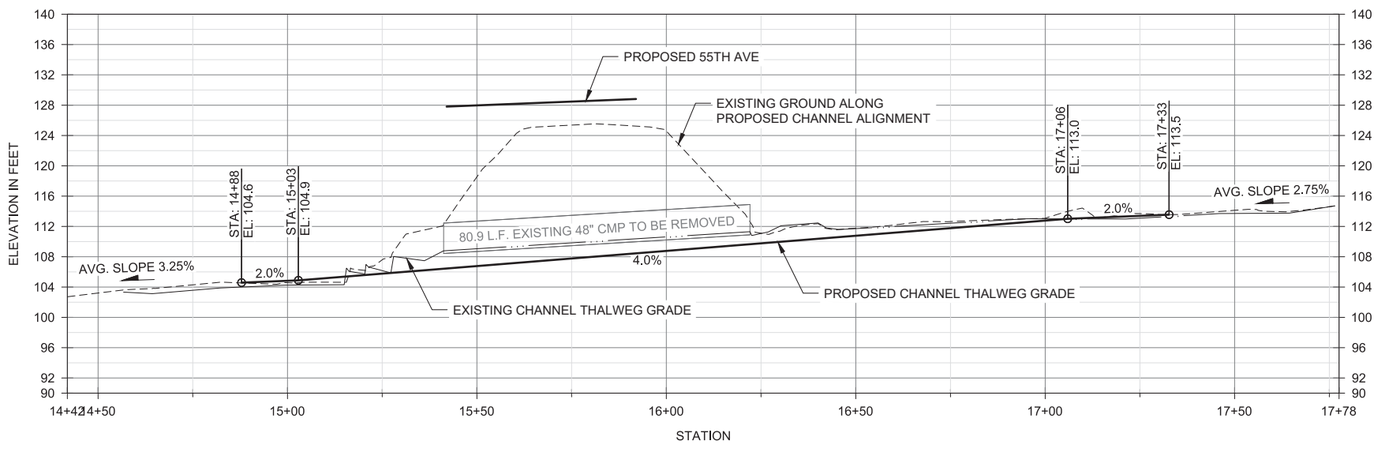
DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: WL3.01
SHEET NO: 51 OF 61

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PROFILE - KACKMAN CREEK PROPOSED CHANNEL

SCALE: 1" = 20' HORIZ.
1" = 10' VERT.

GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.
2. BRIDGE STRUCTURE, RETAINING WALLS, AND ROADWAY GRADING SHOWN FOR REFERENCE ONLY. SEE RD AND BR SHEETS FOR DETAILS.
3. UTILITY RELOCATIONS AND INSTALLATIONS BY OTHERS. SEE CONTRACT SPECIFICATIONS.
4. SEE DWG RD1.01 FOR ROADWAY PLAN AND PROFILE.
5. SEE DWG ST2.02 FOR FOR STREAM BANK SLOPE KEY AND ROUGHENED CHANNEL CENTERLINE CONTROL TABLES.

HORIZONTAL SCALE IN FEET
20 0 20 40
10 0 10 20
VERTICAL SCALE IN FEET
VERTICAL EXAGGERATION X 2

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No.	REVISION	BY	APP'D	DATE

ONE INCH
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STILLAGUAMISH
stulǝgʷa'bš
VILLAGE

HERRERA

I A. B. MOSTRENKO
STATE OF WASHINGTON
56069
REGISTERED
PROFESSIONAL ENGINEER
02/04/20

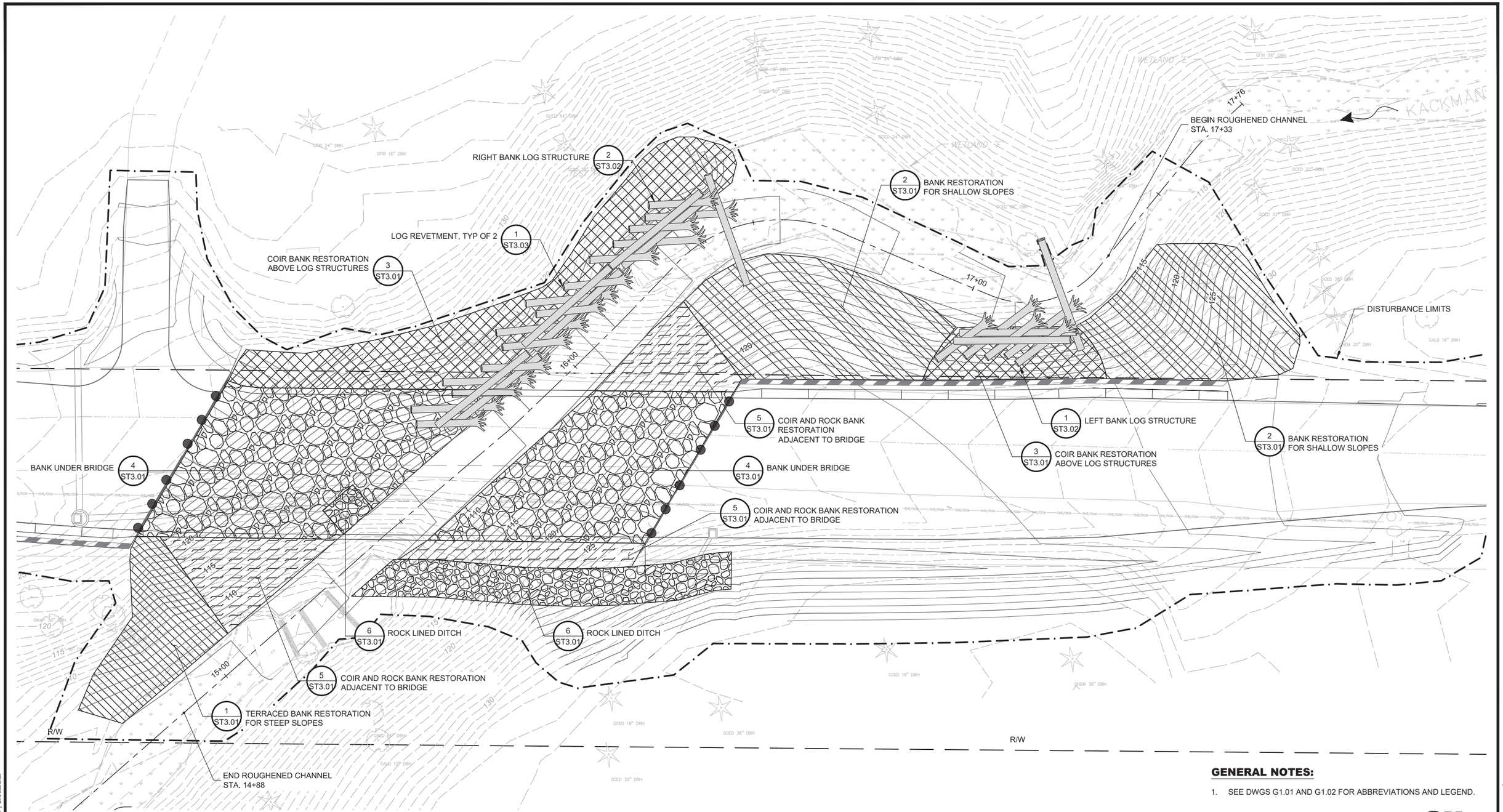
DESIGNED: I. MOSTRENKO	DRAWN: E. MARSHALL
DESIGNED: C. AVOLIO	DRAWN:
DESIGNED:	CHECKED: M. EWBANK
SCALE:	APPROVED: I. MOSTRENKO

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

STREAM PLAN, PROFILE, AND GRADING

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: ST1.01
SHEET NO: 52 OF 61

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GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.

10 0 10 20
1"=10'

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HERRERA

IAN B. MOSTRENKO — STATE OF WASHINGTON — 36069 — REGISTERED PROFESSIONAL ENGINEER

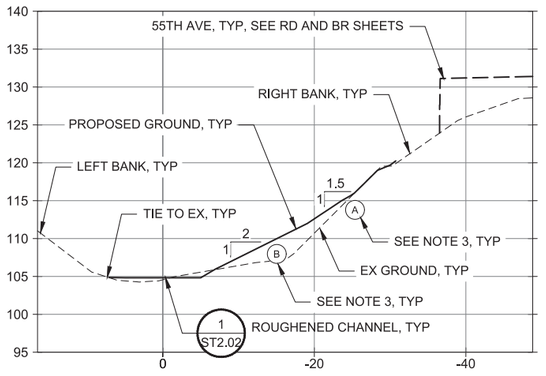
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DESIGNED:	CHECKED: M. EWBANK
SCALE:	APPROVED: I. MOSTRENKO

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

STREAM CHANNEL AND BANK RESTORATION PLAN

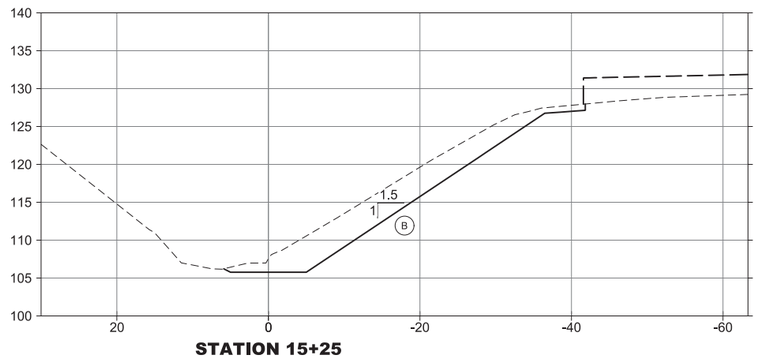
DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	ST1.02
SHEET NO:	53 OF 61

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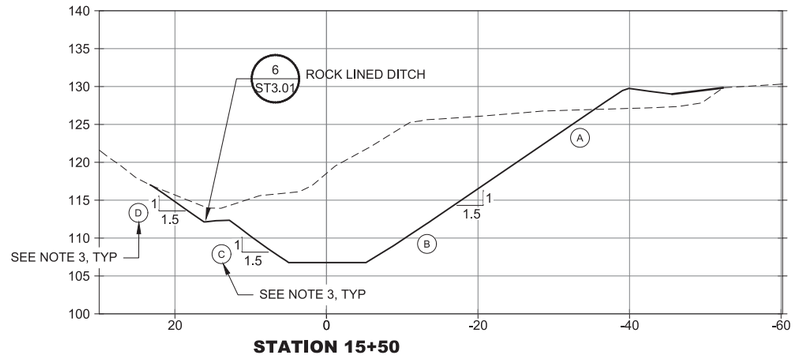
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VERT. SCALE: 1"=10'



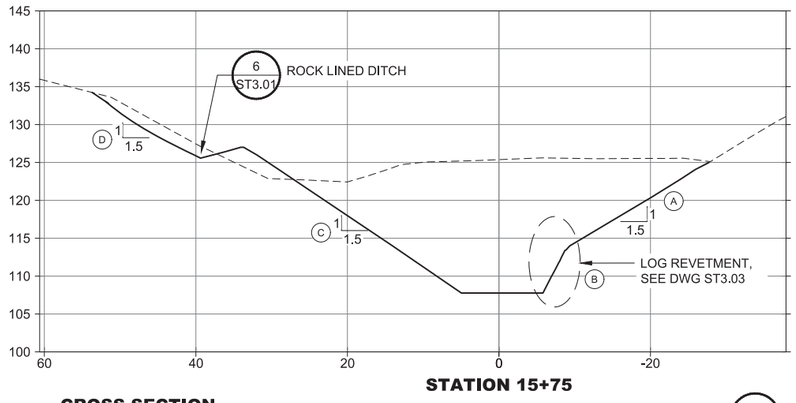
CROSS SECTION — B ST1.01

HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'



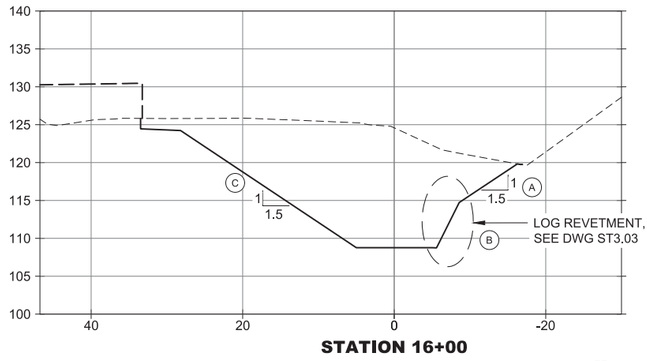
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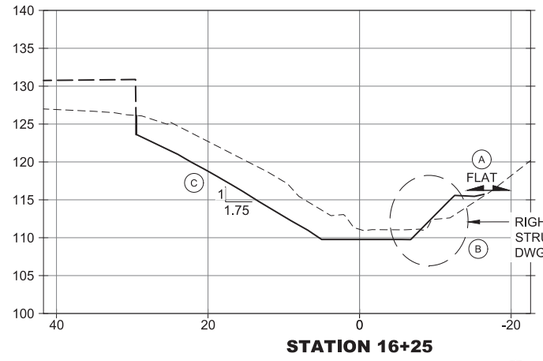
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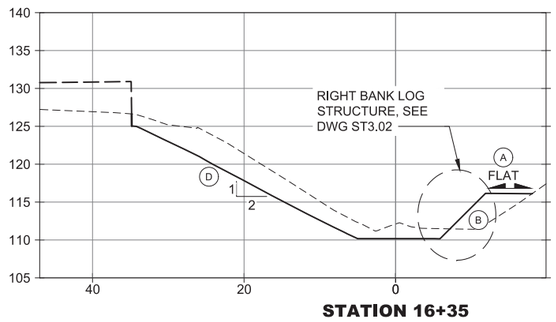
CROSS SECTION — E ST1.01

HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'



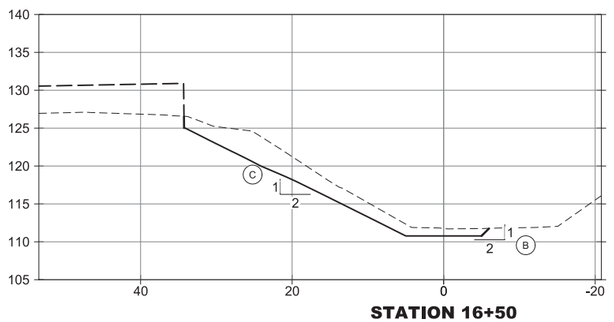
CROSS SECTION — F ST1.01

HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'



CROSS SECTION — G ST1.01

HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'



CROSS SECTION — H ST1.01

HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'

HORIZONTAL SCALE IN FEET
10 0 10 20
10 0 10 20
VERTICAL SCALE IN FEET
VERTICAL EXAGGERATION X 1

GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.
2. SEE DWG ST3.01 FOR STREAM AND BANK DETAILS.
3. SEE DWG ST2.02 FOR STREAM BANK SLOPE KEY AND ROUGHENED CHANNEL CENTERLINE CONTROL TABLES.

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No.	REVISION	BY	APP'D	DATE

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STILLAGUAMISH stulǝgʷaʔbš VILLAGE

HERRERA

I. B. MOSTRENKO — STATE OF WASHINGTON — 36069 — REGISTERED PROFESSIONAL ENGINEER — 02/03/20

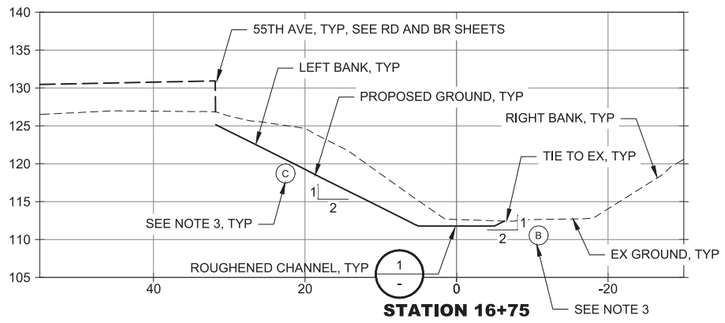
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DESIGNED: C. AVOLIO	DRAWN:
DESIGNED:	CHECKED: M. EWBANK
SCALE:	APPROVED: I. MOSTRENKO

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

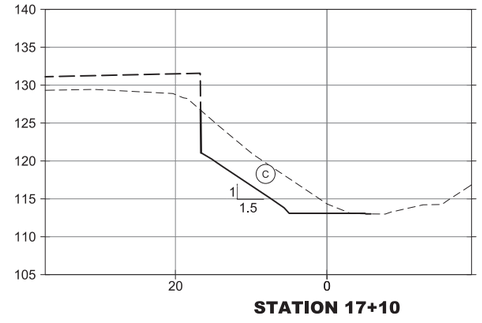
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DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	ST2.01
SHEET NO:	54 OF 61

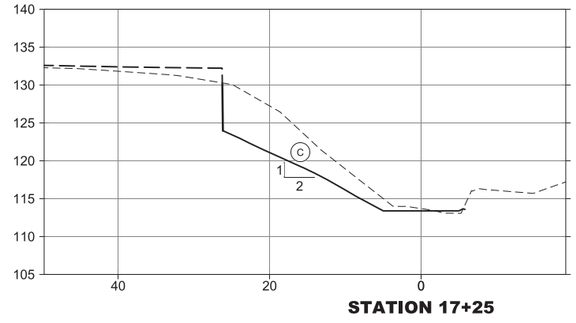
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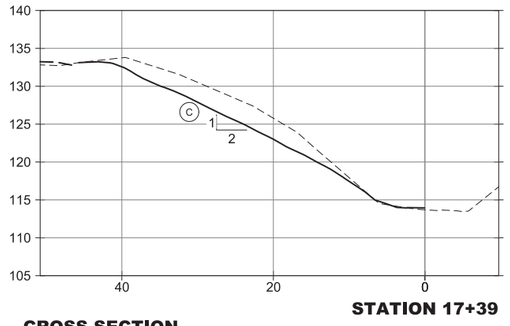
CROSS SECTION (I / ST1.01)
HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'



CROSS SECTION (J / ST1.01)
HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'



CROSS SECTION (K / ST1.01)
HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'

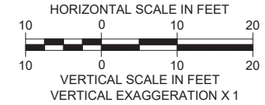


CROSS SECTION (L / ST1.01)
HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'

ROUGHENED CHANNEL NOTES:

1. EXCAVATION SIDE SLOPE AND EXTENT OF EXCAVATION INTO EXISTING BANK TO PLACE ROUGHENED CHANNEL MIX VARIES AS SHOWN ON PLAN, TO PROTECT TREES AND VEGETATION, AND AS DIRECTED BY ENGINEER.
2. KEY ROUGHENED CHANNEL MIX INTO EXISTING BANK AT LEAST 3 FEET.
3. FINISHED GRADE SHOWN FOR CHANNEL BED IS AVERAGE ELEVATION FOR STREAMBED AT CONTROL ELEVATION SPECIFIED IN CHANNEL CENTERLINE CONTROL POINT TABLE. LARGE BOULDERS TO BE PLACED AT VARIABLE ELEVATIONS TO CREATE A COMPLEX CHANNEL GEOMETRY AS DIRECTED BY THE ENGINEER WITH TOP OF BOULDERS NOT TO EXCEED 12" ABOVE CONTROL POINT ELEVATION OR 6" BELOW CONTROL POINT ELEVATION TO CREATE ROUGH SURFACE AS SHOWN IN DETAIL.
4. TRANSITION ROCK HEIGHT ON BANK FOR APPROXIMATELY 5' TO 6' OF CHANNEL LENGTH AT INTERFACE WITH EXISTING CHANNEL GRADES UPSTREAM AND DOWNSTREAM.

DETAIL - TYPICAL ROUGHENED CHANNEL (1 / ST1.01, ST1.02)
SCALE: NTS



GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.
2. SEE DWG ST3.01 FOR STREAM AND BANK DETAILS.

TABLE: ROUGHENED CHANNEL CENTERLINE CONTROL

STATION	NORTHING	EASTING	ELEVATION (FT)
14+75.00	446,796.15	1,318,109.51	104.29 (EXISTING)
15+00.00	446,814.95	1,318,093.03	104.83
15+25.00	446,833.71	1,318,076.50	105.77
15+50.00	446,852.43	1,318,059.94	106.77
15+75.00	446,871.51	1,318,043.78	107.77
16+00.00	446,889.78	1,318,026.73	108.77
16+25.00	446,907.37	1,318,008.97	109.77
16+50.00	446,927.99	1,317,995.80	110.77
16+75.00	446,952.09	1,318,000.25	111.77
17+00.00	446,975.15	1,318,009.91	112.77
17+25.00	446,998.69	1,318,008.75	113.39
17+50.00	447,014.84	1,317,989.72	114.12 (EXISTING)

TABLE: STREAMBANK SLOPE KEY

START STATION	END STATION	UPPER RB SLOPE (H:V) (A)	LOWER RB SLOPE (H:V) (B)	LOWER LB SLOPE (H:V) (C)	UPPER LB SLOPE (H:V) (D)
14+88	15+00	1.5	2	N/A	N/A
15+00	15+10	1.5	TRANSITION FROM 2 TO 1.5	N/A	N/A
15+10	15+32	1.5	1.5	N/A	N/A
15+32	15+55	1.5	1.5	1.5	1.5
15+55	15+75	1.5	TRANSITION FROM 1.5 TO 1	1.5	1.5
15+75	16+16	1.5	1	1.5	1.5
16+16	16+25	TRANSITION FROM 1.5 TO 0	TRANSITION FROM 1 TO 1.5	TRANSITION FROM 1.5 TO 1.75	TRANSITION FROM 1.5 TO 1.75
16+25	16+35	0	1.5	TRANSITION FROM 1.75 TO 2	TRANSITION FROM 1.75 TO 2
16+35	16+45	0	TRANSITION FROM 1.5 TO 2	2	2
16+45	16+96	N/A	2	TRANSITION FROM 2 TO 1.5	TRANSITION FROM 2 TO 1.5
16+96	17+21	N/A	N/A	1.5	1.5
17+21	17+25	N/A	N/A	TRANSITION FROM 1.5 TO 2	TRANSITION FROM 1.5 TO 2
17+25	17+33	N/A	N/A	2	2

N/A = NOT APPLICABLE
LB = LEFT BANK
RB = RIGHT BANK

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HERRERA

I. B. MOSTRENKO — STATE OF WASHINGTON — 36069 — REGISTERED PROFESSIONAL ENGINEER — 02/03/20

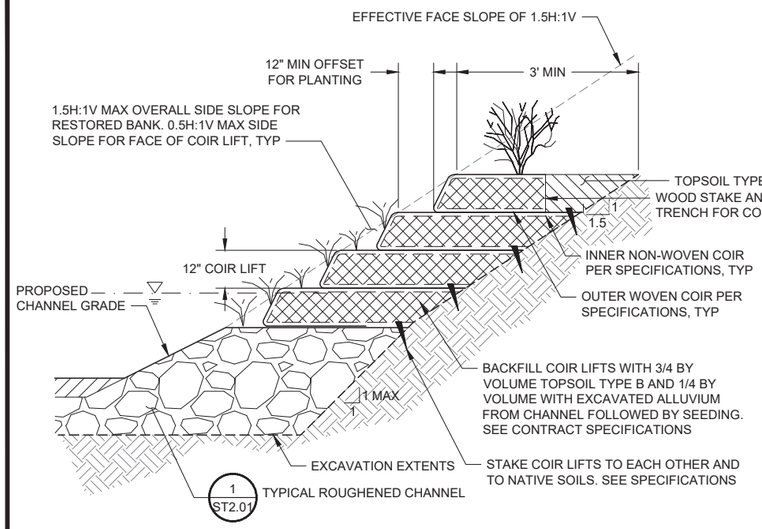
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DESIGNED: C. AVOLIO	DRAWN:
DESIGNED:	CHECKED: M. EWBANK
SCALE:	APPROVED: I. MOSTRENKO

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

STREAM SECTIONS 2

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: ST2.02
SHEET NO: 55 OF 61

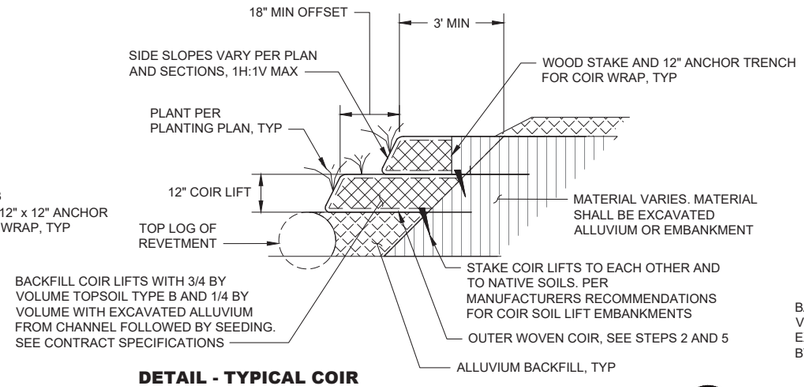
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DETAIL - TYPICAL TERRACED BANK RESTORATION FOR STEEP SLOPES

SCALE: NTS

1 ST1.02



DETAIL - TYPICAL COIR BANK RESTORATION ABOVE LOG STRUCTURES

SCALE: NTS

3 ST1.02

COIR WRAP PREPARATION

(SEE SPECIFICATIONS)

STEP 1
- OVEREXCAVATE TO PLACE COIR WRAP SOIL LIFTS
- PROTECT SUBGRADE FROM FOOT TRAFFIC AND CONSTRUCTION ACTIVITIES THAT COULD CAUSE SOIL DISTURBANCE OR BANK SETTLEMENT PRIOR TO COIR PLACEMENT

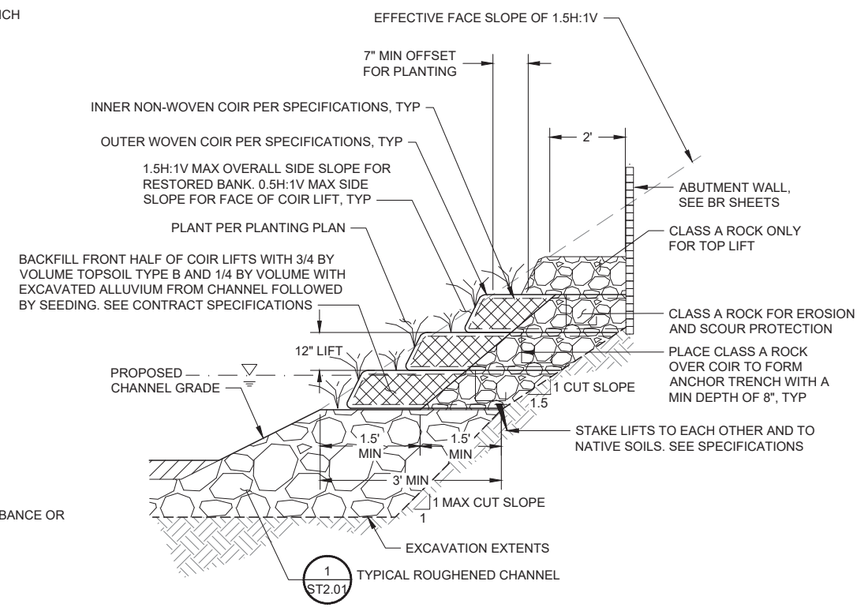
STEP 2
- PLACE OUTER WOVEN COIR FOR THE BOTTOM OF THE LIFT
- PLACE INNER NON-WOVEN COIR
- STAKE COIR FABRIC TO NATIVE SOIL BELOW LIFT

STEP 3
- INSTALL FORM (IF CONTRACTOR CHOOSES) TO HOLD COIR WRAP AND SOIL TO DESIGN DIMENSIONS
- PLACE 12" HIGH LAYER OF SOIL COMPOSED OF TOPSOIL TYPE B AMENDED WITH ALLUVIUM AND COMPACT PER SPECIFICATIONS

STEP 4
- PLACE SEED MIX PER PLANTING PLAN AND SPECIFICATIONS

STEP 5
- WRAP OUTER WOVEN COIR AND INNER NON-WOVEN COIR AROUND SOIL LIFT TO ENCASE THE LIFT

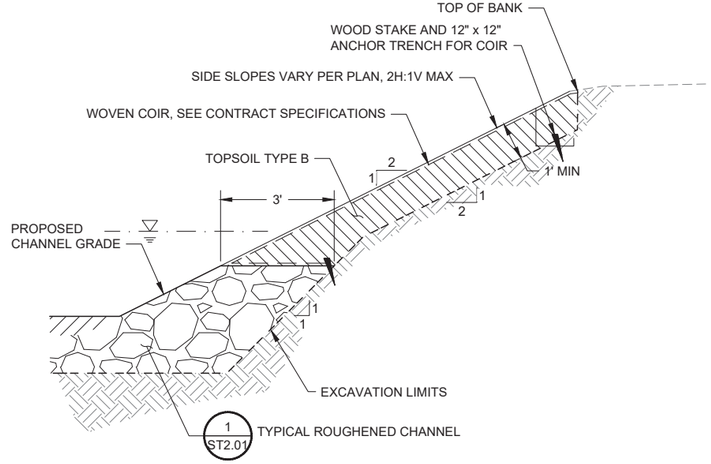
STEP 6
- STAKE PER DETAIL



DETAIL - COIR AND ROCK BANK RESTORATION ADJACENT TO BRIDGE

SCALE: NTS

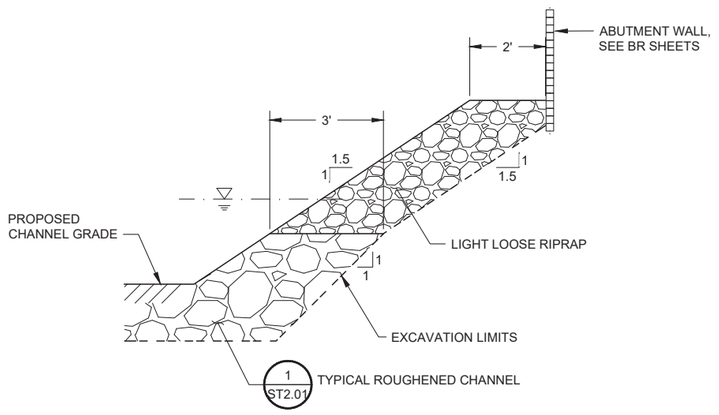
5 ST1.02



DETAIL - TYPICAL BANK RESTORATION FOR SHALLOW SLOPES

SCALE: NTS

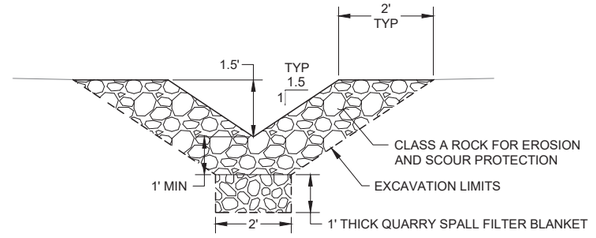
2 ST1.02



DETAIL - TYPICAL BANK UNDER BRIDGE

SCALE: NTS

4 ST1.02



DETAIL - TYPICAL ROCK LINED DITCH

SCALE: NTS

6 ST1.01, ST1.02

GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.

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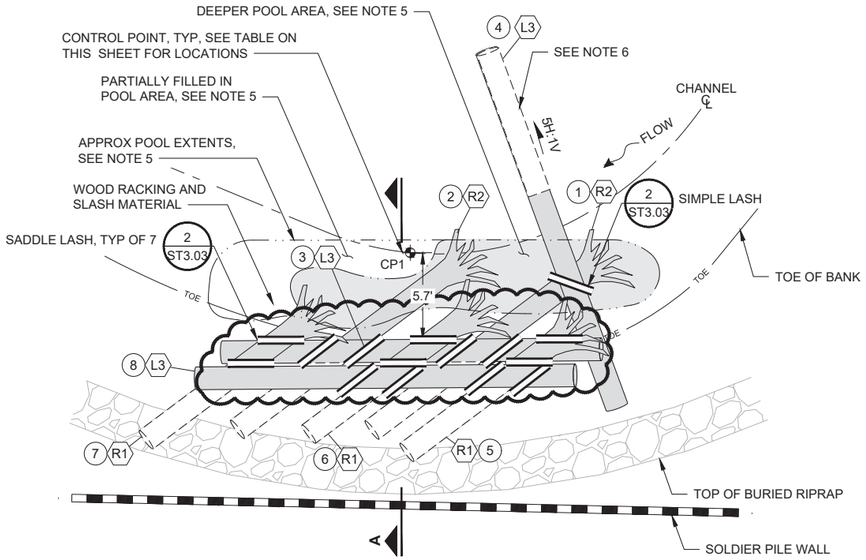
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KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

STREAM DETAILS 1

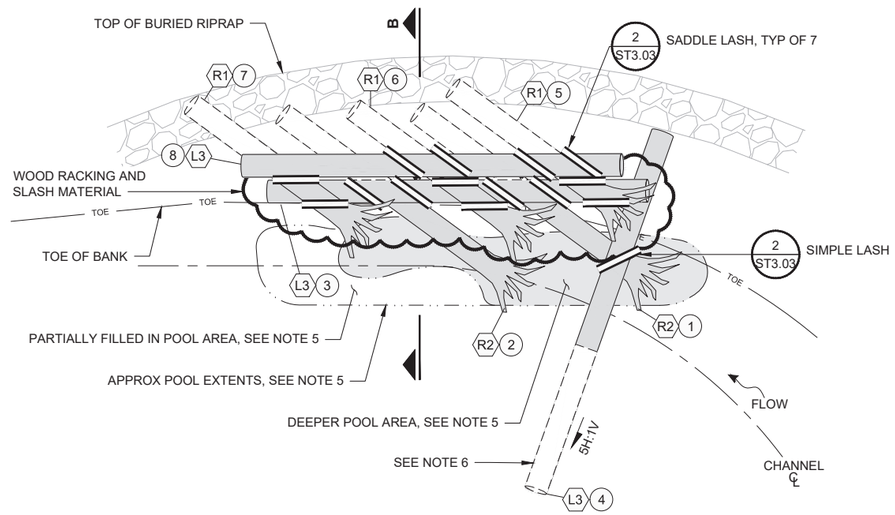
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PROJECT NO:	15-06057-005
DRAWING NO:	ST3.01
SHEET NO:	56 OF 61

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DETAIL - LEFT BANK LOG STRUCTURE 1 ST1.02

SCALE: NTS



DETAIL - RIGHT BANK LOG STRUCTURE 2 ST1.02

SCALE: NTS

LOG SURVEY CONTROL POINT TABLE:		
POINT	CHANNEL STA	ELEVATION
LEFT BANK LOG STRUCTURE		
CP1	17+09	113.07
RIGHT BANK LOG STRUCTURE		
CP1	16+35	110.17

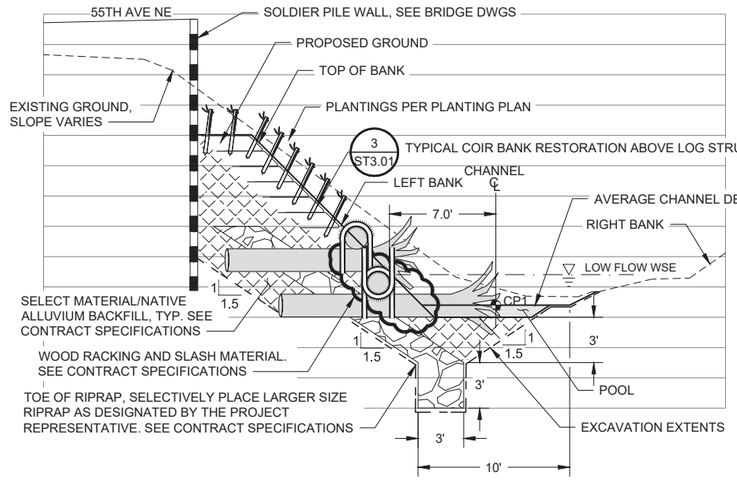
LOG SCHEDULE - BANK LOG STRUCTURE:				
LOG TYPE	MIN DIA (IN)	LENGTH (FT)	ROOTWAD (YES/NO)	TOTAL QTY PER STRUCTURE
R1	18	15	YES	3
R2	18	20	YES	2
L3	18	25	NO	3
1	DENOTES LOG PLACEMENT SEQUENCE			

NOTES:

1. STRUCTURE LOCATION AND LOG ORIENTATION AND DEPTH SHOWN IS APPROXIMATE AND WILL VARY FOR EACH STRUCTURE BASED ON SITE SPECIFIC CONDITIONS. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL FLAG STRUCTURE CONTROL POINT LOCATIONS. THE PROJECT REPRESENTATIVE SHALL THEN MAKE ANY NECESSARY FIELD ADJUSTMENTS TO LOG LOCATIONS, ORIENTATIONS AND DEPTHS. CONTRACTOR SHALL VERIFY FINAL STRUCTURE LOCATION AND EXCAVATION EXTENTS WITH PROJECT REPRESENTATIVE PRIOR TO CONSTRUCTION. SEE CONTRACT SPECIFICATIONS.
2. LOGS SHALL BE PLACED AT THE LOCATIONS, ELEVATIONS, DEPTHS AND ORIENTATIONS SPECIFIED ON THE DRAWINGS OR AS DESIGNATED BY THE PROJECT REPRESENTATIVE.
3. CONTRACTOR SHALL BACKFILL ALL EXCAVATIONS AS SHOWN. SEE CONTRACT SPECIFICATIONS FOR COMPACTION REQUIREMENTS.
4. BURIED PORTION OF LOGS SHOWN ON PLAN VIEW ONLY.
5. EXCAVATE SCOUR POOL 1 FOOT BELOW AVERAGE CHANNEL DESIGN GRADES. LOCATION AND DIMENSIONS TO BE ADJUSTED IN THE FIELD AS DESIGNATED BY THE PROJECT REPRESENTATIVE.
6. LOWER 10 FEET OF LOG TO BE BURIED BELOW CHANNEL BED AND TOE IN APPROXIMATE POSITION SHOWN, AS DIRECTED BY THE PROJECT REPRESENTATIVE.

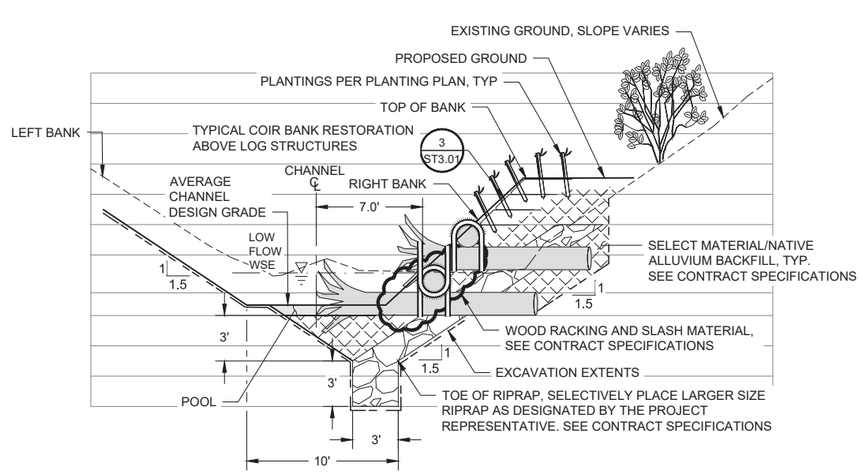
GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.



SECTION - LEFT BANK LOG STRUCTURE A -

SCALE: NTS



SECTION - RIGHT BANK LOG STRUCTURE B -

SCALE: NTS

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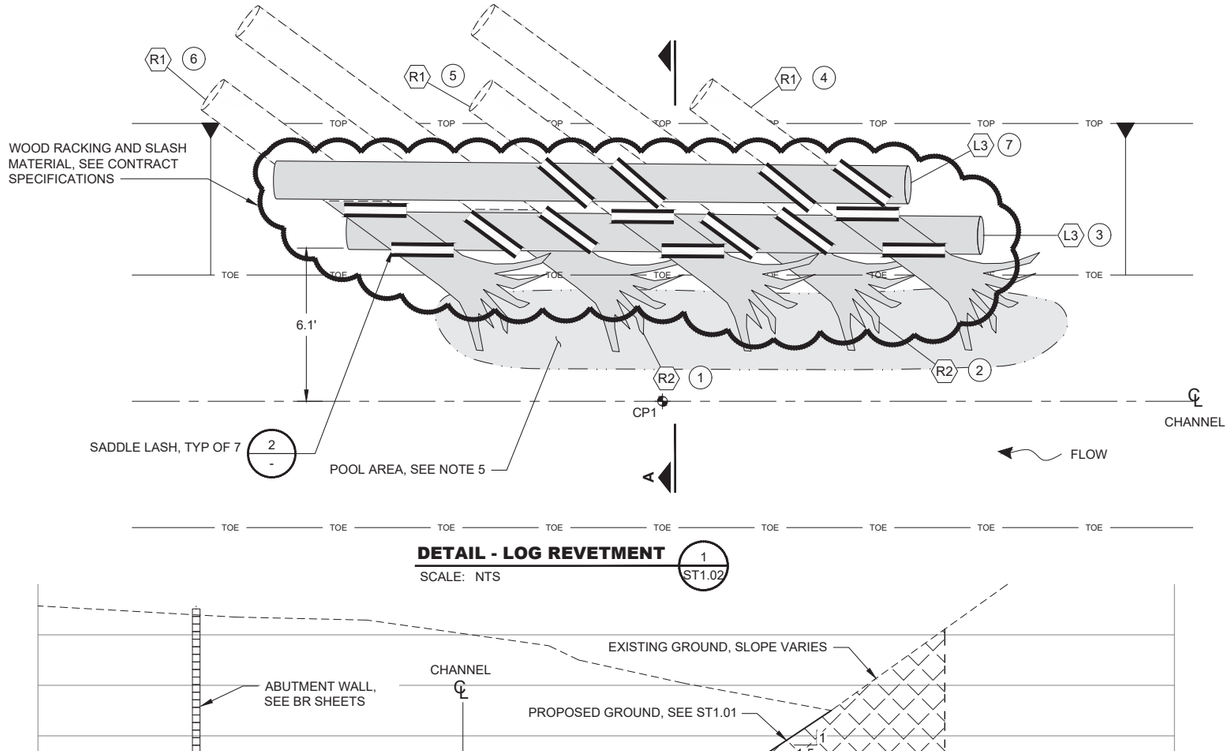
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KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

STREAM DETAILS 2

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: ST3.02
SHEET NO: 57 OF 61

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DETAIL - LOG REVETMENT

1 / ST1.02

SCALE: NTS

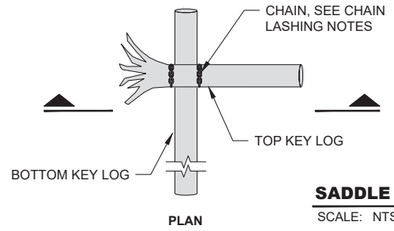
SECTION - LOG REVETMENT

A / -

SCALE: NTS

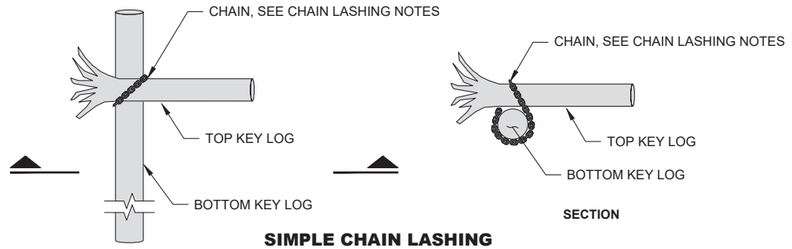
NOTES:

1. STRUCTURE LOCATION AND LOG ORIENTATION AND DEPTH SHOWN IS APPROXIMATE AND WILL VARY FOR EACH STRUCTURE BASED ON SITE SPECIFIC CONDITIONS. PRIOR TO CONSTRUCTION CONTRACTOR SHALL FLAG STRUCTURE CONTROL POINT LOCATION. THE PROJECT REPRESENTATIVE SHALL THEN MAKE ANY NECESSARY FIELD ADJUSTMENTS TO LOG LOCATIONS, ORIENTATIONS AND DEPTHS. CONTRACTOR SHALL VERIFY FINAL STRUCTURE LOCATION AND EXCAVATION EXTENTS WITH PROJECT REPRESENTATIVE PRIOR TO CONSTRUCTION.
2. LOGS SHALL BE PLACED AT THE LOCATIONS, ELEVATIONS, DEPTHS AND ORIENTATIONS SPECIFIED ON THE DRAWINGS OR AS DESIGNATED BY THE PROJECT REPRESENTATIVE. TRIM LOGS AS NEEDED TO BUTT UP TO SHEETPILE RETAINING WALL.
3. CONTRACTOR SHALL BACKFILL ALL EXCAVATIONS USING RIPRAP AND EXCAVATED ALLUVIUM AS SHOWN.
4. BURIED PORTION OF LOGS SHOWN ON PLAN VIEW ONLY.
5. EXCAVATE SCOUR POOL 1 FOOT BELOW AVERAGE CHANNEL DESIGN GRADES. LOCATION AND DIMENSIONS TO BE ADJUSTED IN THE FIELD AS DESIGNATED BY THE PROJECT REPRESENTATIVE.



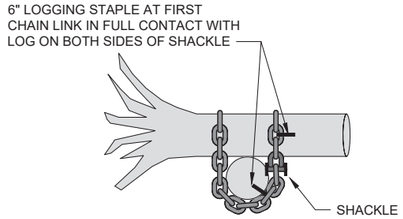
SADDLE CHAIN LASHING

SCALE: NTS



SIMPLE CHAIN LASHING

SCALE: NTS



CHAIN CONNECTION

SCALE: NTS

CHAIN LASHING NOTES:

1. LASH HORIZONTAL LOGS TO VERTICAL TIMBER PILES WITH CHAIN AS SHOWN ON DETAIL AND LAYERING PLAN OR AS DIRECTED BY PROJECT REPRESENTATIVE. CHAIN LASHING SYSTEM SHALL BE PUT IN TENSION TO 1/4 OF THE CHAIN WORKING LOAD LIMIT AND BE MAINTAINED DURING CHAIN SHACKLING.
2. CHAIN LENGTH NEEDED PER LASHING WILL VARY BASED ON DIAMETER OF LOGS AT THE ACTUAL LOCATIONS THEY ARE LASHED TOGETHER.
3. CHAIN FOR LASHING SHALL BE 3/8 INCH DIAMETER CARBON-WELDED GRADE 43 HIGH-TEST CHAIN, WITH A MINIMUM WORKING LOAD LIMIT OF 5400 LBS.
4. ALL HARDWARE USED FOR LASHING SHALL BE STAINLESS STEEL OR NATURAL UNTREATED STEEL, AND CONNECTIONS SHALL BE OF THE QUANTITY AND TYPE SPECIFIED BY THE MANUFACTURER WITH AN EQUAL OR GREATER STRENGTH THAN THE CHAIN BREAKING STRENGTH OR AS APPROVED BY THE PROJECT REPRESENTATIVE.
5. MAR OR ROUND ALL EXPOSED HARDWARE NUTS AND BOLT THREADS AFTER INSTALLATION FOR THEFT PROTECTION. PROJECT REPRESENTATIVE OR OWNER SHALL APPROVE ANY COATING PRIOR TO CONTRACTOR APPLYING IT. SECURE CHAIN TO LOG AND PILE USING 6 INCH LOGGING STAPLE.
6. CONTRACTOR MAY SUBMIT ALTERNATIVE CHAIN CONNECTION SYSTEM FOR APPROVAL.

DETAIL - CHAIN LASHING

2 / -

SCALE: NTS

LOG SCHEDULE - LOG REVETMENT:

LOG TYPE	MIN DIA (IN)	LENGTH (FT)	ROOTWAD (YES/NO)	TOTAL QTY PER STRUCTURE
R1	18	15	YES	3
R2	18	20	YES	2
L3	18	25	NO	2
1	DENOTES LOG PLACEMENT SEQUENCE			

LOG SURVEY CONTROL POINT TABLE:

POINT	CHANNEL STA	ELEVATION
REVETMENT 1		
CP1	16+12	109.25
REVETMENT 2		
CP1	15+86	108.21

GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.

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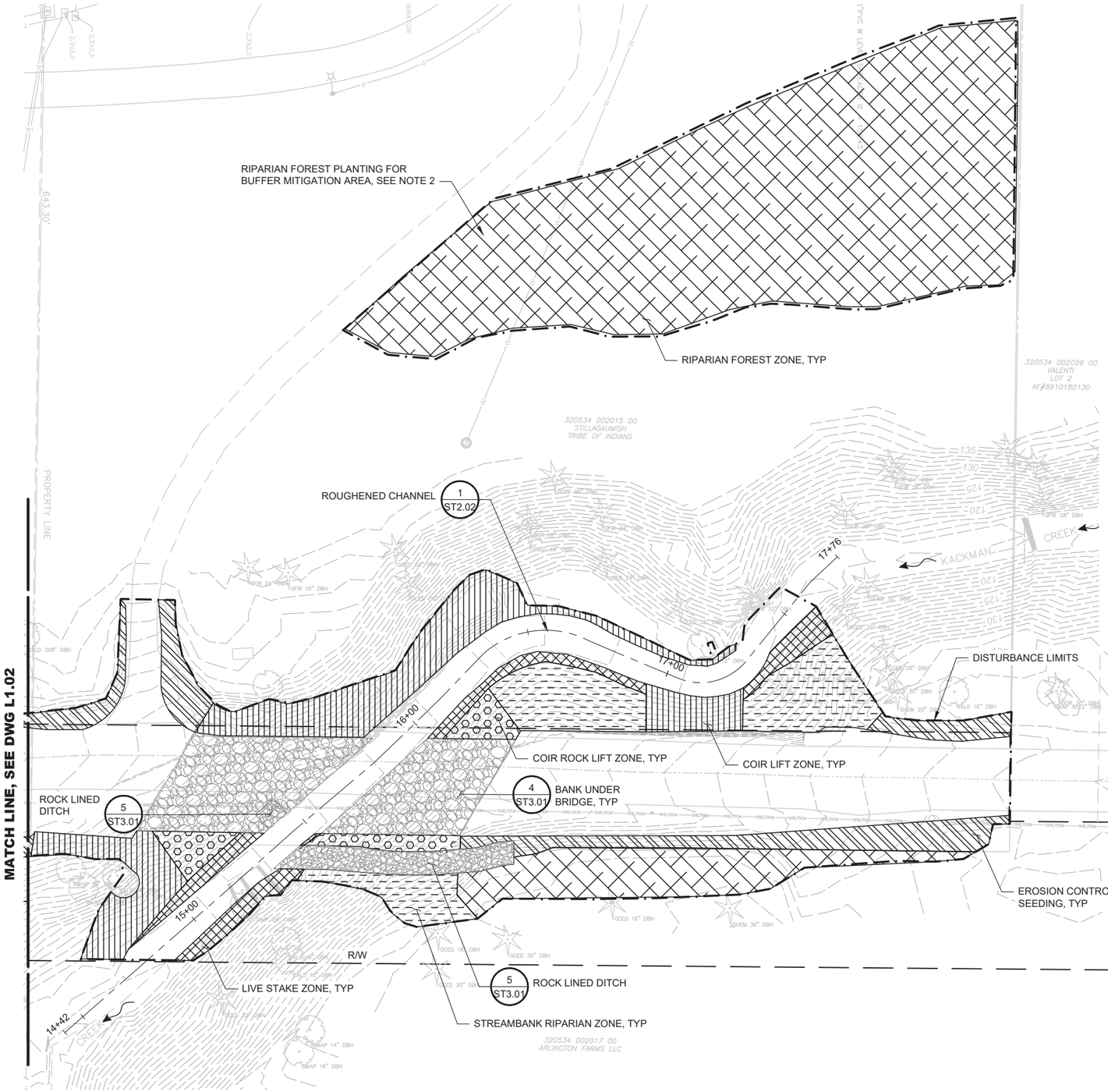
IAN R. MOSTRENKO, STATE OF WASHINGTON, 36069, REGISTERED PROFESSIONAL ENGINEER

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

STREAM DETAILS 3

DATE: FEBRUARY 2020
PROJECT NO: 15-06057-005
DRAWING NO: ST3.03
SHEET NO: 58 OF 61

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PLANTING NOTES:

1. ENGINEER SHALL APPROVE GRADING PRIOR TO PLANT INSTALLATION, WITH THE EXCEPTION OF SEEDING TO TAKE PLACE DURING THE CONSTRUCTION OF COIR LIFTS.
2. SEEDING SHALL OCCUR IN FALL, BETWEEN SEPTEMBER AND THE END OF OCTOBER, WITH THE EXCPETION OF SEEDING ON COIR LIFTS.
3. BUFFER MITIGATION AREA TO BE DECOMPACTED AND RECEIVE MULCH AND COMPOST PRIOR TO PLANTING PER THE CONTRACT SPECIFICATIONS.
4. SEEDING SHALL OCCUR THROUGHOUT ALL PLANTING AREAS. COIR LIFTS AND AREAS WITH COIR MATTING SHALL BE SEEDED BY HAND (555 SQUARE YARDS). ALL OTHER PLANTING AREAS SHALL BE HYDRAULICALLY SEEDED (0.67 ACRES).
5. CONTAINER AND PLUG PLANTING SHALL TAKE PLACE ACCORDING TO SECTION 8-02.3(8), NON-IRRIGATED PLANT MATERIAL WEST OF THE SUMMIT OF THE CASCADE RANGE, BETWEEN OCTOBER 1 AND MARCH 1. LIVE STAKE PLANTING SHALL TAKE PLACE WHEN PLANTS ARE DORMANT, USUALLY BETWEEN DECEMBER AND FEBRUARY.
6. NO PLANTING SHALL OCCUR IN SNOW OR ICE OR WHEN THE GROUND IS FROZEN.
7. ALL PLANTS SHALL CONFORM TO THE STANDARDS OF THE CURRENT EDITION OF AMERICAN STANDARD FOR NURSERY STOCK AS APPROVED BY THE AMERICAN STANDARDS INSTITUTE (ANSI z60.1-2014).
8. PLANTS SHALL BE SOURCED FROM REGIONAL NURSERIES NO FURTHER THAN 100 MILES FROM THE PROJECT SITE.
9. PLANT SUBSTITUTIONS ARE SUBJECT TO APPROVAL BY BIOLOGIST, LANDSCAPE ARCHITECT, OR PROJECT REPRESENTATIVE FAMILIAR WITH SPECIFIED PLANT MATERIAL AND EXPERIENCE ON SIMILAR RESTORATION PROJECTS.
10. PLANTS SHALL BE TAGGED OR MARKED FOR IDENTIFICATION WHEN DELIVERED. PLANTS SHALL BE GROUPED IN BUNDLES OR PACKAGES NO GREATER THAN 50, WITH THE EXCEPTION OF PLUG MATERIAL.
11. BIOLOGIST OR LANDSCAPE ARCHITECT SHALL INSPECT ALL PLANT MATERIAL UPON EACH DAY OF DELIVERY. PROVIDE HEALTHY STOCK, GROWN IN NURSERY AND REASONABLY FREE OF DIE-BACK, DISEASE, INSECTS, EGGS, BORES, AND LARVAE. PLANTS SHALL HAVE A ROOT SYSTEM, STEM, AND BRANCH FORM THAT WILL NOT RESTRICT NORMAL GROWTH, STABILITY AND HEALTH FOR THE EXPECTED LIFE OF THE PLANT. ALL PLANTS WITH DAMAGED ROOTS, LEADERS, OR BRANCHES SHALL BE REJECTED. ROOTBOUND AND J-ROOTED PLANTS WILL BE REJECTED. PLANTS THAT CONTAIN INVASIVE SPECIES OR WEEDS SHALL BE REJECTED.
12. KEEP PLANTS PROTECTED UNTIL THE ACTUAL TIME OF PLANTING. DO NOT LET THE PLANT MATERIAL SUFFER FROM WIND EXPOSURE, SNOW, OR DRY OUT BEFORE PLANTING.
13. BIOLOGIST OR LANDSCAPE ARCHITECT SHALL APPROVE PLANT BOUNDARIES AND MULCH ZONES LAYOUT PRIOR TO PLANTING.
14. CARE SHALL BE TAKEN WHEN CUTTING COIR MATTING FOR PLANT INSTALLATION. CUT PLANTING HOLES WITH A UTILITY KNIFE, BOX KNIFE, BOX CUTTER, OR SIMILARLY APPROPRIATE TOOL BY MAKING THREE INCISIONS JUST LARGE ENOUGH TO INSTALL PLANTING MATERIAL THAT REQUIRES DIGGING. ENSURE ALL PLANT ROOTS ARE EMBEDDED IN SOIL AND REMOVE AIR POCKETS AND GAPS WITH FINGERS AS BACKFILLING SOIL. REPLACE FABRIC AROUND THE BASE OF THE PLANTS AND IF NECESSARY, ANCHOR IN PLACE.
15. THOROUGHLY WATER ALL PLANTED AREAS IMMEDIATELY AFTER PLANTING. WATER FOR OPTIMAL GROWTH DURING DRY PERIODS DURING PLANT ESTABLISHMENT. SEE CONTRACT SPECIFICATIONS.
16. APPLY 4" OF WOOD CHIP MULCH ACCORDING TO PLANTING DETAILS AND SECTION 8-02.3(11) OF STANDARD SPECIFICATIONS.
17. SEEDING AND FERTILIZING SHALL BE PREPARED, AMENDED, AND SEEDED ACCORDING TO SECTION 8-02.3(9)B, AND 9-14 OF THE SPECIFICATIONS.

GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.
2. SEE DWG L1.02 FOR PLANTING SCHEDULE AND SEED SCHEDULE, AND DWG L1.03 FOR PLANTING DETAILS.

LEGEND:

- COIR LIFT ZONE (3,210 SF OR 357 SY)
- LIVE STAKE ZONE (1,045 SF)
- COIR ROCK LIFT ZONE (740 SF)
- STREAMBANK RIPARIAN ZONE (2,545 SF)
- RIPARIAN FOREST ZONE (15,729 SF)
- EROSION CONTROL SEEDING ONLY - NO PLANTING (11,000 SF)

20 0 20 40
1"=20'

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STATE OF WASHINGTON · KATHRYN SUZANNE FORESTER · No. 1448 EXP. 10/21/19 · LICENSED LANDSCAPE ARCHITECT

DESIGNED: K. FORESTER	DRAWN: E. MARSHALL		
DESIGNED: C. AVOLIO	DRAWN:		
DESIGNED:	CHECKED: M. EWBANK		
SCALE:	APPROVED: K. FORESTER		

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

PLANTING PLAN NORTH

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	L1.01
SHEET NO:	59 OF

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PLANT SCHEDULE:

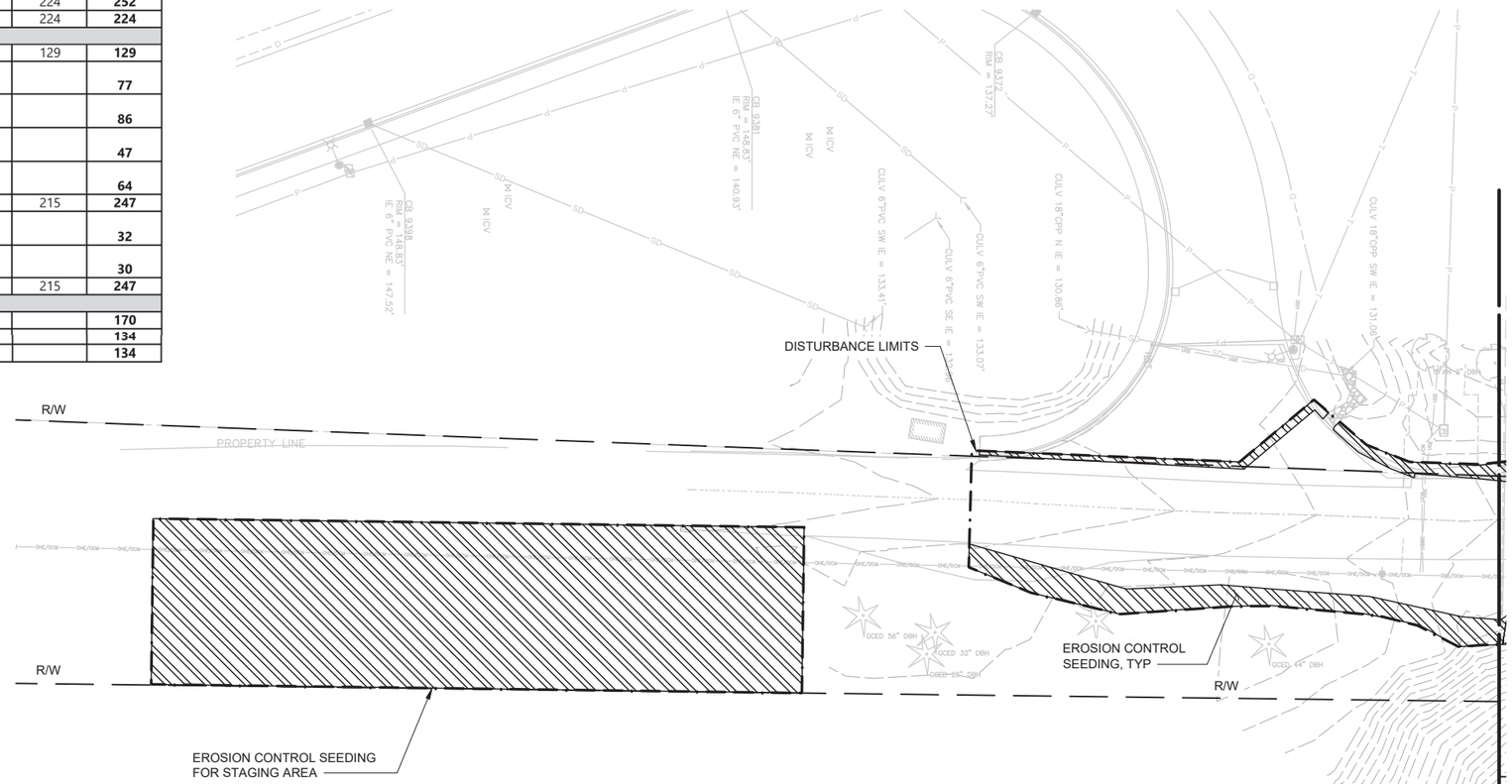
Scientific Name	Common Name	Stock Type	O.C. Spacing (Feet)	Planting Zone					Total Quantity
				Coir Lift	Coir Rock Lift	Live Stake	Streambank Riparian	Riparian Forest	
Trees									
Acer macrophyllum	Bigleaf maple	2 GAL DEEP ROOT POTS	15				4	24	**28**
Pseudotsuga menziesii	Douglas-fir	2 GAL DEEP ROOT POTS	15				4	24	**28**
Thuja plicata	Western red cedar	2 GAL DEEP ROOT POTS	15				4	24	**28**
Shrubs									
Acer circinatum	Vine maple	1 GAL	6				11	71	**82**
Mahonia aquifolium	Tall Oregon grape	1 GAL	4					160	**160**
Physocarpus capitatus	Pacific ninebark	1 GAL	4	23			32		**55**
Rubus spectabilis	Salmonberry	1 GAL	4	23			32		**55**
Sambucus racemosa	Red elderberry	1 GAL	4				16	160	**176**
Symphoricarpos albus	Snowberry	1 GAL	4	12			16	224	**252**
Rosa nutkana	Nootka rose	1 GAL	4					224	**224**
Groundcover									
Athyrium felix-femina	Lady fern	4 Inch Pot	2					129	**129**
Carex obnupta	Slough sedge	10-Inch Deep Root Plug	2	47		30			**77**
Carex obnupta	Slough sedge	4- to 6-Inch Deep Root Plug	1		86				**86**
Deschampsia cespitosa	Tufted hairgrass	4- to 6-Inch Deep Root Plug	2	47					**47**
Deschampsia cespitosa	Tufted hairgrass	4- to 6-Inch Deep Root Plug	1		64				**64**
Polystichum munitum	Sword fern	4 Inch Pot	2				32	215	**247**
Rubus ursinus	Trailing blackberry	4- to 6-Inch Deep Root Plug	2				32		**32**
Scirpus microcarpus	Small-fruited bulrush	10-Inch Deep Root Plug	2			30			**30**
Tellima grandiflora	Fringecup	4 Inch Pot	2				32	215	**247**
Live Stakes									
Cornus sericea	Redosier dogwood	4' Live Stake	3	104	10	27	29		**170**
Salix scouleriana	Scouler's willow	4' Live Stake	3	83	10	41			**134**
Salix sitchensis	Sitka willow	4' Live Stake	3	83	10	41			**134**

SEED SCHEDULE:

Erosion Control Seed Mix - Apply at a seeding rate of 69.1 PLS Pounds/Acre within the following areas.*

Scientific Name	Common Name	Percent Species Composition (%)	Planting Zone				
			Coir Lift	Coir Rock Lift	Streambank Riparian	Riparian Forest	Erosion Control Seeding
			PLS pounds				
Bromus carinatus	California brome	12	5 PLS Pounds	1 PLS Pounds	4 PLS Pounds	25 PLS Pounds	17 PLS Pounds
Chamerion angustifolium	Common Fireweed	30					
Deschampsia cespitosa	Tufted hairgrass	15					
Elymus glaucus	Blue wildrye	20					
Festuca rubra	Red fescue	13					
Lupinus polyphyllus	Bigleaf lupine	7					
Triticum aestivum	Regreen wheatgrass	3					

*Seeding shall occur prior to the placement of coir, installation of plants, and placement of mulch.



GENERAL NOTES:

1. SEE DWGS G1.01 AND G1.02 FOR ABBREVIATIONS AND LEGEND.
2. SEE DWG L1.01 FOR PLANTING NOTES AND DWG L1.03 FOR PLANTING DETAILS.

LEGEND:

- COIR LIFT ZONE (3,210 SF)
- LIVE STAKE ZONE (1,045 SF)
- COIR ROCK LIFT ZONE (740 SF)
- STREAMBANK RIPARIAN ZONE (2,545 SF)
- RIPARIAN FOREST ZONE (15,729 SF)
- EROSION CONTROL SEEDING (11,000 SF)

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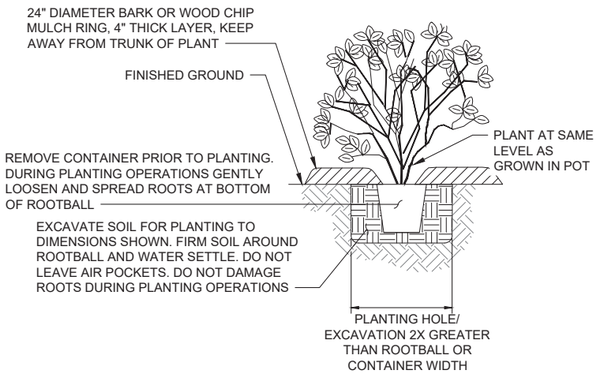
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DESIGNED: C. AVOLIO	DRAWN:		
DESIGNED:	CHECKED: M. EWBANK		
SCALE:	APPROVED: K. FORESTER		

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

PLANTING PLAN SOUTH AND PLANT SCHEDULE

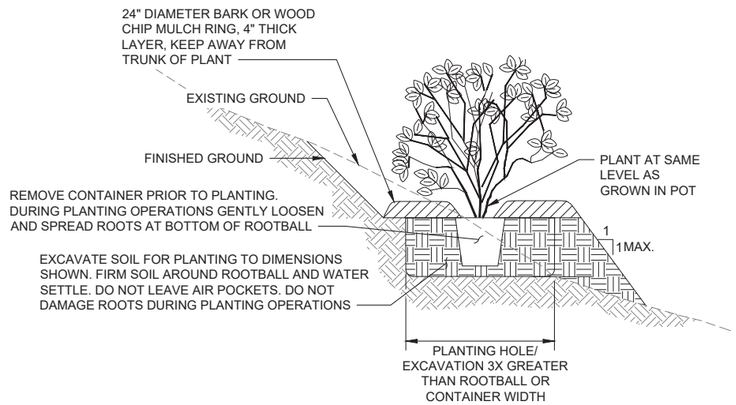
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PROJECT NO: 15-06057-005
DRAWING NO: L1.02
SHEET NO: 60 OF

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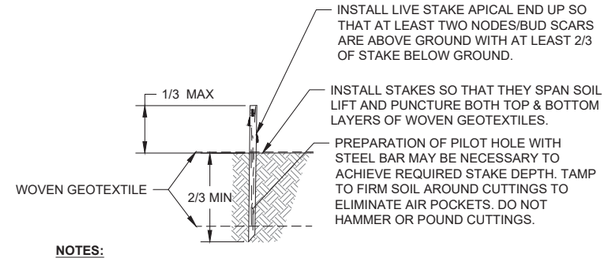
DETAIL - CONTAINER TREE AND SHRUB PLANTING 1 / -

SCALE: NTS



DETAIL - CONTAINER TREE AND SHRUB PLANTING ON SLOPE 2 / -

SCALE: NTS

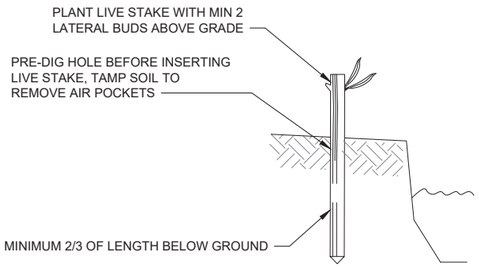


DETAIL - LIVE STAKE PLANTING IN COIR LIFTS 3 / -

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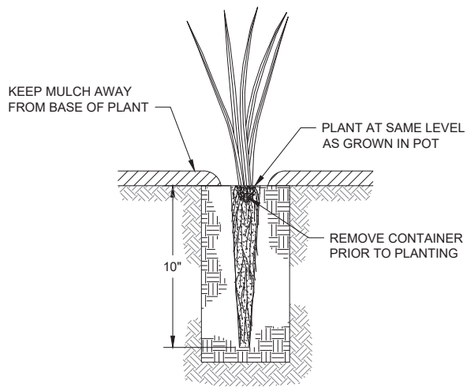
NOTES:

1. SOAK WILLOW STAKES IN WATER FOR MINIMUM 24 HOURS PRIOR TO PLANTING.
2. BASAL END OF LIVE STAKES SHOULD BE 0.5-1.5 INCHES IN DIAMETER AND AT LEAST 4 FEET IN LENGTH.
3. ALL STAKES SHOULD BE SINGLE STEMMED AND STRAIGHT, WITH NO MAJOR CROOKS OR BENDS. PRUNING OF STAKES SHALL OCCUR ONLY AT ENDS OF MATERIAL.
4. KEEP LIVE STAKES COVERED, COOL, AND MOIST AT ALL TIMES PRIOR TO PLANTING. AT NO TIME SHOULD LIVE STAKES BE EXPOSED AND ALLOWED TO DRY OUT.
5. WHEN PLANTING ON STREAM BANKS, ANGLE APICAL END OF STAKES SLIGHTLY DOWNSTREAM.



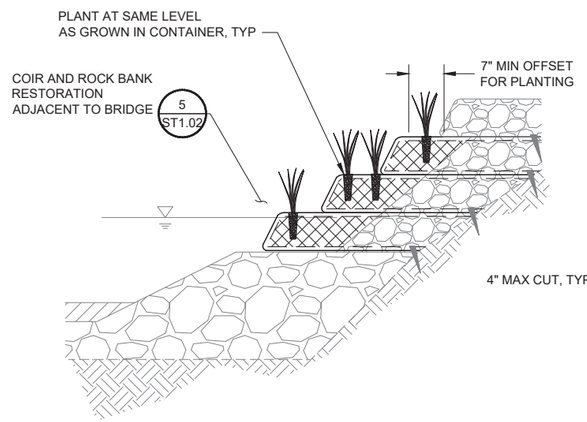
DETAIL - LIVE STAKE PLANTING 4 / -

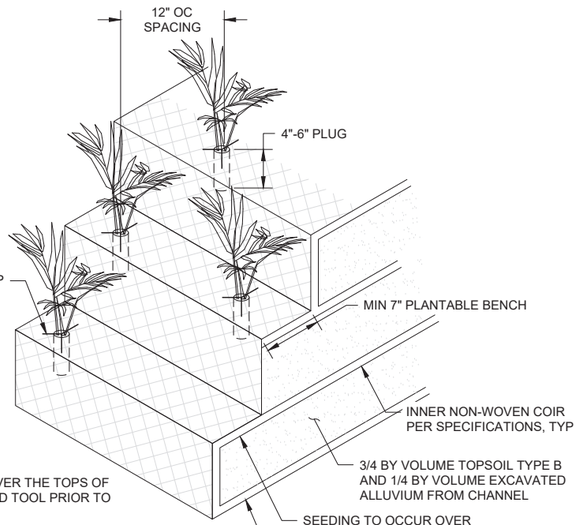
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DETAIL - 10-INCH DEEP ROOT PLUG PLANTING 5 / -

SCALE: NTS





NOTES:

1. SEEDING OF COIR LIFTS SHALL OCCUR PRIOR TO PLACEMENT OF BOTH COIR MATERIALS OVER THE TOPS OF THE LIFTS. ROUGHEN SOIL SURFACE AFTER PLACEMENT WITH HAND RAKE OR SIMILAR HAND TOOL PRIOR TO SEEDING. SEEDS SHALL HAVE GOOD SEED TO SOIL CONTACT TO PROMOTE GERMINATION.
2. 4-INCH TO 6-INCH PLUGS SHALL BE PLANTED BY CUTTING A MAXIMUM OF 3 SLITS NO LARGER THAN 4 INCHES EACH WITH A UTILITY KNIFE, BOX KNIFE, BOX CUTTER, OR SIMILARLY APPROPRIATE TOOL. SLIT SIZE SHALL BE JUST LARGE ENOUGH TO INSTALL PLUGS AND SHALL MINIMIZE DISTURBANCE TO FABRIC.
3. ENSURE ALL PLANT ROOTS ARE EMBEDDED IN LIFT SOIL AND REMOVE AIR POCKETS AND GAPS BY USING FINGERS TO PRESS SOIL AROUND BASE OF PLUG. PLUGS SHOULD BE INSTALLED FIRMLY WITHIN LIFTS AND RESIST REMOVAL WHEN TUGGED OR PULLED BY HAND.
4. REPLACE FABRIC AROUND BASE OF PLUG BY FOLDING FABRIC BACK IN PLACE AND TAMPING INTO SOIL.
5. PLUGS SHALL BE SPACED 12 INCHES ON CENTER FOR COIR AND ROCK BANK RESTORATION LIFTS AND 24 INCHES ON CENTER FOR TYPICAL TERRACED BANK LIFTS.

DETAIL - PLUG PLANTING ON COIR AND ROCK BANK RESTORATION ADJACENT TO BRIDGE 6 / -

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STATE OF WASHINGTON · KATHRYN SUZANNE FORESTER · 1448 EXP 12/10/20 · LICENSED LANDSCAPE ARCHITECT

DESIGNED: K. FORESTER	DRAWN: E. MARSHALL
DESIGNED: C. AVOLIO	DRAWN:
DESIGNED:	CHECKED: M. EWBANK
SCALE:	APPROVED: K. FORESTER

KACKMAN CREEK 55TH AVE CULVERT REPLACEMENT SNO CTY PFN #19-112866 D5

PLANTING DETAILS

DATE:	FEBRUARY 2020
PROJECT NO:	15-06057-005
DRAWING NO:	L1.03
SHEET NO:	61 OF

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APPENDIX B

Temporary Erosion and Sediment Control (TESC) and Construction Stormwater Pollution Prevention Plan (CSWPPP)

EROSION CONTROL NOTES:

THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.

THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.

PUBLIC AND PRIVATE DRAINAGE WAYS SHALL BE PROTECTED FROM POLLUTION. NO MATERIAL IS TO BE DISCHARGED OR DEPOSITED IN STORMWATER SYSTEMS THAT MAY RESULT IN VIOLATION OF STATE OR FEDERAL WATER QUALITY STANDARDS.

DURING ANY DITCH, CREEK, OR DRAINAGE WORK, RUNOFF SHALL BE DIVERTED AROUND THE WORK AREA WITH A PUMP, DIVERSIONS, BARRIERS, OR OTHER METHODS.

CONSTRUCTION STOMWATER POLLUTION PREVENTION PLAN (SWPPP) ELEMENTS:

ELEMENT 1 - PRESERVE VEGETATION/MARK CLEARING LIMITS

a. BEFORE BEGINNING LAND-DISTURBING ACTIVITIES, INCLUDING CLEARING AND GRADING, CLEARLY MARK ALL CLEARING LIMITS, SENSITIVE AREAS AND THEIR BUFFERS, AND TREES THAT ARE TO BE PRESERVED WITHIN THE CONSTRUCTION AREA.

b. RETAIN THE DUFF LAYER, NATIVE TOPSOIL, AND NATURAL VEGETATION IN AN UNDISTURBED STATE TO THE MAXIMUM DEGREE PRACTICABLE.

ELEMENT 2 - ESTABLISH CONSTRUCTION ACCESS

a. LIMIT CONSTRUCTION VEHICLE ACCESS AND EXIT TO ONE ROUTE, IF POSSIBLE.

b. STABILIZE ACCESS POINTS WITH A PAD OF QUARRY SPALLS, CRUSHED ROCK, OR OTHER EQUIVALENT BMPS, TO MINIMIZE TRACKING SEDIMENT ONTO ROADS.

c. LOCATE WHEEL WASH OR TIRE BATHS ON SITE, IF THE STABILIZED CONSTRUCTION ENTRANCE IS NOT EFFECTIVE IN PREVENTING TRACKING SEDIMENT ONTO ROADS.

d. IF SEDIMENT IS TRACKED OFF SITE, CLEAN THE AFFECTED ROADWAY THOROUGHLY AT THE END OF EACH DAY, OR MORE FREQUENTLY AS NECESSARY (FOR EXAMPLE, DURING WET WEATHER). REMOVE SEDIMENT FROM ROADS BY SHOVELING, SWEEPING, OR PICKUP AND TRANSPORT OF THE SEDIMENT TO A CONTROLLED SEDIMENT DISPOSAL AREA.

e. CONDUCT STREET WASHING ONLY AFTER SEDIMENT REMOVAL IN ACCORDANCE WITH SPECIAL CONDITION S9.D.2.D. CONTROL STREET WASH WASTEWATER BY PUMPING BACK ON SITE OR OTHERWISE PREVENTING IT FROM DISCHARGING INTO SYSTEMS TRIBUTARY TO WATERS OF THE STATE.

ELEMENT 3 - CONTROL FLOW RATES

a. PROTECT PROPERTIES AND WATERWAYS DOWNSTREAM OF DEVELOPMENT SITES FROM EROSION AND THE ASSOCIATED DISCHARGE OF TURBID WATERS DUE TO INCREASES IN THE VELOCITY AND PEAK VOLUMETRIC FLOW RATE OF STORMWATER RUNOFF FROM THE PROJECT SITE, AS REQUIRED BY LOCAL PLAN APPROVAL AUTHORITY.

b. WHERE NECESSARY TO COMPLY WITH SPECIAL CONDITION S9.D.3.A, CONSTRUCT STORMWATER RETENTION OR DETENTION FACILITIES AS ONE OF THE FIRST STEPS IN GRADING. ASSURE THAT DETENTION FACILITIES FUNCTION PROPERLY BEFORE CONSTRUCTING SITE IMPROVEMENTS (FOR EXAMPLE, IMPERVIOUS SURFACES).

c. IF PERMANENT INFILTRATION PONDS ARE USED FOR FLOW CONTROL DURING CONSTRUCTION, PROTECT THESE FACILITIES FROM SILTATION DURING THE CONSTRUCTION PHASE.

ELEMENT 4 - INSTALL SEDIMENT CONTROLS

THE PERMITTEE MUST DESIGN, INSTALL AND MAINTAIN EFFECTIVE EROSION CONTROLS AND SEDIMENT CONTROLS TO MINIMIZE THE DISCHARGE OF POLLUTANTS. AT A MINIMUM, THE PERMITTEE MUST DESIGN, INSTALL AND MAINTAIN SUCH CONTROLS TO:

a. CONSTRUCT SEDIMENT CONTROL BMPS (SEDIMENT PONDS, TRAPS, FILTERS, INFILTRATION FACILITIES, ETC.) AS ONE OF THE FIRST STEPS IN GRADING. THESE BMPS MUST BE FUNCTIONAL BEFORE OTHER LAND DISTURBING ACTIVITIES TAKE PLACE.

b. MINIMIZE SEDIMENT DISCHARGES FROM THE SITE. THE DESIGN, INSTALLATION, AND MAINTENANCE OF EROSION AND SEDIMENT CONTROLS MUST ADDRESS FACTORS SUCH AS THE AMOUNT, FREQUENCY, INTENSITY AND DURATION OF PRECIPITATION, THE NATURE OF RESULTING STORMWATER RUNOFF, AND SOIL CHARACTERISTICS, INCLUDING THE RANGE OF SOIL PARTICLE SIZES EXPECTED TO BE PRESENT ON THE SITE.

c. DIRECT STORMWATER RUNOFF FROM DISTURBED AREAS THROUGH A SEDIMENT POND OR OTHER APPROPRIATE SEDIMENT REMOVAL BMP BEFORE THE RUNOFF LEAVES A CONSTRUCTION SITE OR BEFORE DISCHARGE TO AN INFILTRATION FACILITY. RUNOFF FROM FULLY STABILIZED AREAS MAY BE DISCHARGED WITHOUT A SEDIMENT REMOVAL BMP BUT MUST MEET THE FLOW CONTROL PERFORMANCE STANDARD OF SPECIAL CONDITION S9.D.3.A.

d. LOCATE BMPS INTENDED TO TRAP SEDIMENT ON SITE IN A MANNER TO AVOID INTERFERENCE WITH THE MOVEMENT OF JUVENILE SALMONIDS ATTEMPTING TO ENTER OFF-CHANNEL AREAS OR DRAINAGES.

e. PROVIDE AND MAINTAIN NATURAL BUFFERS AROUND SURFACE WATERS, DIRECT STORMWATER TO VEGETATED AREAS TO INCREASE SEDIMENT REMOVAL AND MAXIMIZE STORMWATER INFILTRATION, UNLESS INFEASIBLE.

f. WHERE FEASIBLE, DESIGN OUTLET STRUCTURES THAT WITHDRAW IMPOUNDED STORMWATER FROM THE SURFACE TO AVOID DISCHARGING SEDIMENT THAT IS STILL SUSPENDED LOWER IN THE WATER COLUMN.

ELEMENT 5 - STABILIZE SOILS

a. THE PERMITTEE MUST STABILIZE EXPOSED AND UNWORKED SOILS BY APPLICATION OF EFFECTIVE BMPS THAT PREVENT EROSION. APPLICABLE BMPS INCLUDE BUT ARE NOT LIMITED TO: TEMPORARY AND PERMANENT SEEDING, SODDING, MULCHING, PLASTIC COVERING, EROSION CONTROL FABRICS AND MATTING, SOIL APPLICATION OF POLYACRYLAMIDE (PAM), THE EARLY APPLICATION OF GRAVEL BASE ON AREAS TO BE PAVED, AND DUST CONTROL.

b. THE PERMITTEE MUST CONTROL STORMWATER VOLUME AND VELOCITY WITHIN THE SITE TO MINIMIZE SOIL EROSION.

c. THE PERMITTEE MUST CONTROL STORMWATER DISCHARGES, INCLUDING BOTH PEAK FLOW RATES AND TOTAL STORMWATER VOLUME, TO MINIMIZE EROSION AT OUTLETS AND TO MINIMIZE DOWNSTREAM CHANNEL AND STREAM BANK EROSION.

d. DEPENDING ON THE GEOGRAPHIC LOCATION OF THE PROJECT, THE PERMITTEE MUST NOT ALLOW SOILS TO REMAIN EXPOSED AND UNWORKED FOR MORE THAN THE TIME PERIODS SET FORTH BELOW TO PREVENT EROSION:

WEST OF THE CASCADE MOUNTAINS CREST
DURING THE DRY SEASON (MAY 1 - SEPTEMBER 30): 7 DAYS DURING THE WET SEASON (OCTOBER 1 - APRIL 30): 2 DAYS

EAST OF THE CASCADE MOUNTAINS CREST, EXCEPT FOR CENTRAL BASIN* DURING THE DRY SEASON (JULY 1 - SEPTEMBER 30): 10 DAYS
DURING THE WET SEASON (OCTOBER 1 - JUNE 30): 5 DAYS

THE CENTRAL BASIN*, EAST OF THE CASCADE MOUNTAINS CREST DURING THE DRY SEASON (JULY 1 - SEPTEMBER 30): 30 DAYS DURING THE WET SEASON (OCTOBER 1 - JUNE 30): 15 DAYS
NOTE THE CENTRAL BASIN IS DEFINED AS THE PORTIONS OF EASTERN WASHINGTON WITH MEAN ANNUAL PRECIPITATION OF FEWER THAN 12 INCHES.

e. THE PERMITTEE MUST STABILIZE SOILS AT THE END OF THE SHIFT BEFORE A HOLIDAY OR WEEKEND IF NEEDED BASED ON THE WEATHER FORECAST.

f. THE PERMITTEE MUST STABILIZE SOIL STOCKPILES FROM EROSION, PROTECTED WITH SEDIMENT TRAPPING MEASURES, AND WHERE POSSIBLE, BE LOCATED AWAY FROM STORM DRAIN INLETS, WATERWAYS, AND DRAINAGE CHANNELS.

g. THE PERMITTEE MUST MINIMIZE THE AMOUNT OF SOIL EXPOSED DURING CONSTRUCTION ACTIVITY.

h. THE PERMITTEE MUST MINIMIZE THE DISTURBANCE OF STEEP SLOPES.

i. THE PERMITTEE MUST MINIMIZE SOIL COMPACTION AND, UNLESS INFEASIBLE, PRESERVE TOPSOIL.

ELEMENT 6 - PROTECT SLOPES

a. THE PERMITTEE MUST DESIGN AND CONSTRUCT CUT-AND-FILL SLOPES IN A MANNER TO MINIMIZE EROSION. APPLICABLE PRACTICES INCLUDE, BUT ARE NOT LIMITED TO, REDUCING CONTINUOUS LENGTH OF SLOPE WITH TERRACING AND DIVERSIONS, REDUCING SLOPE STEEPNESS, AND ROUGHENING SLOPE SURFACES (FOR EXAMPLE, TRACK WALKING).

b. THE PERMITTEE MUST DIVERT OFF-SITE STORMWATER (RUN-ON) OR GROUNDWATER AWAY FROM SLOPES AND DISTURBED AREAS WITH INTERCEPTOR DIKES, PIPES, AND/OR SWALES. OFF-SITE STORMWATER SHOULD BE MANAGED SEPARATELY FROM STORMWATER GENERATED ON THE SITE.

c. AT THE TOP OF SLOPES, COLLECT DRAINAGE IN PIPE SLOPE DRAINS OR PROTECTED CHANNELS TO PREVENT EROSION.

i. WEST OF THE CASCADE MOUNTAINS CREST: TEMPORARY PIPE SLOPE DRAINS MUST HANDLE THE PEAK 10-MINUTE FLOW RATE FROM A TYPE 1A, 10-YEAR, 24-HOUR FREQUENCY STORM FOR THE DEVELOPED CONDITION. ALTERNATIVELY, THE 10-YEAR, 1-HOUR FLOW RATE PREDICTED BY AN APPROVED CONTINUOUS RUNOFF MODEL, INCREASED BY A FACTOR OF 1.6, MAY BE USED. THE HYDROLOGIC ANALYSIS MUST USE THE EXISTING LAND COVER CONDITION FOR PREDICTING FLOW RATES FROM TRIBUTARY AREAS OUTSIDE THE PROJECT LIMITS. FOR TRIBUTARY AREAS ON THE PROJECT SITE, THE ANALYSIS MUST USE THE TEMPORARY OR PERMANENT PROJECT LAND COVER CONDITION, WHICHEVER WILL PRODUCE THE HIGHEST FLOW RATES. IF USING THE WESTERN WASHINGTON HYDROLOGY MODEL (WWHM) TO PREDICT FLOWS, BARE SOIL AREAS SHOULD BE MODELED AS "LANDSCAPED AREA."

ii. EAST OF THE CASCADE MOUNTAINS CREST: TEMPORARY PIPE SLOPE DRAINS MUST HANDLE THE EXPECTED PEAK FLOW RATE FROM A 6-MONTH, 3-HOUR STORM FOR THE DEVELOPED CONDITION, REFERRED TO AS THE SHORT DURATION STORM.

d. PLACE EXCAVATED MATERIAL ON THE UPHILL SIDE OF TRENCHES, CONSISTENT WITH SAFETY AND SPACE CONSIDERATIONS.

e. PLACE CHECK DAMS AT REGULAR INTERVALS WITHIN CONSTRUCTED CHANNELS THAT ARE CUT DOWN A SLOPE.

ELEMENT 7 - PROTECT DRAIN INLETS

a. PROTECT ALL STORM DRAIN INLETS MADE OPERABLE DURING CONSTRUCTION SO THAT STORMWATER RUNOFF DOES NOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR TREATED TO REMOVE SEDIMENT.

b. CLEAN OR REMOVE AND REPLACE INLET PROTECTION DEVICES WHEN SEDIMENT HAS FILLED ONE-THIRD OF THE AVAILABLE STORAGE (UNLESS A DIFFERENT STANDARD IS SPECIFIED BY THE PRODUCT MANUFACTURER).

ELEMENT 8 - STABILIZE CHANNELS AND OUTLETS

a. DESIGN, CONSTRUCT, AND STABILIZE ALL ON-SITE CONVEYANCE CHANNELS TO PREVENT EROSION FROM THE FOLLOWING EXPECTED PEAK FLOWS:

iii. WEST OF THE CASCADE MOUNTAINS CREST: CHANNELS MUST HANDLE THE PEAK 10-MINUTE FLOW RATE FROM A TYPE 1A, 10-YEAR, 24-HOUR FREQUENCY STORM FOR THE DEVELOPED CONDITION. ALTERNATIVELY, THE 10-YEAR, 1-HOUR FLOW RATE INDICATED BY AN APPROVED CONTINUOUS RUNOFF MODEL, INCREASED BY A FACTOR OF 1.6, MAY BE USED. THE HYDROLOGIC ANALYSIS MUST USE THE EXISTING LAND COVER CONDITION FOR PREDICTING FLOW RATES FROM TRIBUTARY AREAS OUTSIDE THE PROJECT LIMITS. FOR TRIBUTARY AREAS ON THE PROJECT SITE, THE ANALYSIS MUST USE THE TEMPORARY OR PERMANENT PROJECT LAND COVER CONDITION, WHICHEVER WILL PRODUCE THE HIGHEST FLOW RATES. IF USING THE WWHM TO PREDICT FLOWS, BARE SOIL AREAS SHOULD BE MODELED AS "LANDSCAPED AREA."

iV. EAST OF THE CASCADE MOUNTAINS CREST: CHANNELS MUST HANDLE THE EXPECTED PEAK FLOW RATE FROM A 6-MONTH, 3-HOUR STORM FOR THE DEVELOPED CONDITION, REFERRED TO AS THE SHORT DURATION STORM.

b. PROVIDE STABILIZATION, INCLUDING ARMORING MATERIAL, ADEQUATE TO PREVENT EROSION OF OUTLETS, ADJACENT STREAM BANKS, SLOPES, AND DOWNSTREAM REACHES AT THE OUTLETS OF ALL CONVEYANCE SYSTEMS.

ELEMENT 9 - CONTROL POLLUTANTS

DESIGN, INSTALL, IMPLEMENT, AND MAINTAIN EFFECTIVE POLLUTION PREVENTION MEASURES TO MINIMIZE THE DISCHARGE OF POLLUTANTS. THE PERMITTEE MUST:

a. HANDLE AND DISPOSE OF ALL POLLUTANTS, INCLUDING WASTE MATERIALS AND DEMOLITION DEBRIS THAT OCCUR ON SITE IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF STORMWATER.

b. PROVIDE COVER, CONTAINMENT, AND PROTECTION FROM VANDALISM FOR ALL CHEMICALS, LIQUID PRODUCTS, PETROLEUM PRODUCTS, AND OTHER MATERIALS THAT HAVE THE POTENTIAL TO POSE A THREAT TO HUMAN HEALTH OR THE ENVIRONMENT. ON-SITE FUELING TANKS MUST INCLUDE SECONDARY CONTAINMENT. SECONDARY CONTAINMENT MEANS PLACING TANKS OR CONTAINERS WITHIN AN IMPERVIOUS STRUCTURE CAPABLE OF CONTAINING 110% OF THE VOLUME CONTAINED IN THE LARGEST TANK WITHIN THE CONTAINMENT STRUCTURE. DOUBLE- WALLED TANKS DO NOT REQUIRE ADDITIONAL SECONDARY CONTAINMENT.

c. CONDUCT MAINTENANCE, FUELING, AND REPAIR OF HEAVY EQUIPMENT AND VEHICLES USING SPILL PREVENTION AND CONTROL MEASURES. CLEAN CONTAMINATED SURFACES IMMEDIATELY FOLLOWING ANY SPILL INCIDENT.

d. DISCHARGE WHEEL WASH OR TIRE BATH WASTEWATER TO A SEPARATE ON-SITE TREATMENT SYSTEM THAT PREVENTS DISCHARGE TO SURFACE WATER, SUCH AS CLOSED-LOOP RECIRCULATION OR UPLAND LAND APPLICATION, OR TO THE SANITARY SEWER WITH LOCAL SEWER DISTRICT APPROVAL.

e. APPLY FERTILIZERS AND PESTICIDES IN A MANNER AND AT APPLICATION RATES THAT WILL NOT RESULT IN LOSS OF CHEMICAL TO STORMWATER RUNOFF. FOLLOW MANUFACTURERS' LABEL REQUIREMENTS FOR APPLICATION RATES AND PROCEDURES.

f. USE BMPS TO PREVENT CONTAMINATION OF STORMWATER RUNOFF BY PH-MODIFYING SOURCES. THE SOURCES FOR THIS CONTAMINATION INCLUDE, BUT ARE NOT LIMITED TO: BULK CEMENT, CEMENT KILN DUST, FLY ASH, NEW CONCRETE WASHING AND CURING WATERS, RECYCLED CONCRETE STOCKPILES, WASTE STREAMS GENERATED FROM CONCRETE GRINDING AND SAWING, EXPOSED AGGREGATE PROCESSES, DEWATERING CONCRETE VAULTS, CONCRETE PUMPING, AND MIXER WASHOUT WATERS. (ALSO REFER TO THE DEFINITION FOR "CONCRETE WASTEWATER" IN APPENDIX A--DEFINITIONS.)

g. ADJUST THE PH OF STORMWATER OR AUTHORIZED NON-STORMWATER IF NECESSARY TO PREVENT AN EXCEEDANCE OF GROUNDWATER AND/OR SURFACE WATER QUALITY STANDARDS.

h. ASSURE THAT WASHOUT OF CONCRETE TRUCKS IS PERFORMED OFF-SITE OR IN DESIGNATED CONCRETE WASHOUT AREAS ONLY. DO NOT WASH OUT CONCRETE TRUCK DRUMS OR CONCRETE HANDLING EQUIPMENT ONTO THE GROUND, OR INTO STORM DRAINS, OPEN DITCHES, STREETS, OR STREAMS. WASHOUT OF CONCRETE HANDLING EQUIPMENT MAY BE DISPOSED OF IN A DESIGNATED CONCRETE WASHOUT AREA OR IN A FORMED AREA AWAITING CONCRETE WHERE IT WILL NOT CONTAMINATE SURFACE OR GROUNDWATER. DO NOT DUMP EXCESS CONCRETE ON SITE, EXCEPT IN DESIGNATED CONCRETE WASHOUT AREAS. CONCRETE SPILLAGE OR CONCRETE DISCHARGE DIRECTLY TO GROUNDWATER OR SURFACE WATERS OF THE STATE IS PROHIBITED. DO NOT WASH OUT TO FORMED AREAS AWAITING LID FACILITIES.

i. OBTAIN WRITTEN APPROVAL FROM ECOLOGY BEFORE USING ANY CHEMICAL TREATMENT, EXCEPT FOR CO2 OR DRY ICE USED TO ADJUST pH.

j. UNCONTAMINATED WATER FROM WATER-ONLY BASED SHAFT DRILLING FOR CONSTRUCTION OF BUILDING, ROAD, AND BRIDGE FOUNDATIONS MAY BE INFILTRATED PROVIDED THE WASTEWATER IS MANAGED IN A WAY THAT PROHIBITS DISCHARGE TO SURFACE WATERS. PRIOR TO INFILTRATION, WATER FROM WATER-ONLY BASED SHAFT DRILLING THAT COMES INTO CONTACT WITH CURING CONCRETE MUST BE NEUTRALIZED UNTIL pH IS IN THE RANGE OF 6.5 TO 8.5 (SU).

ELEMENT 10 - CONTROL DEWATERING

a. PERMITTEES MUST DISCHARGE FOUNDATION, VAULT, AND TRENCH DEWATERING WATER, WHICH HAVE CHARACTERISTICS SIMILAR TO STORMWATER RUNOFF AT THE SITE, INTO A CONTROLLED CONVEYANCE SYSTEM BEFORE DISCHARGE TO A SEDIMENT TRAP OR SEDIMENT POND.
b. PERMITTEES MAY DISCHARGE CLEAN, NON-TURBID DEWATERING WATER, SUCH AS WELL- POINT GROUNDWATER, TO SYSTEMS TRIBUTARY TO, OR DIRECTLY INTO SURFACE WATERS OF THE STATE, AS SPECIFIED IN SPECIAL CONDITION S9.D.8, PROVIDED THE DEWATERING FLOW DOES NOT CAUSE EROSION OR FLOODING OF RECEIVING WATERS. DO NOT ROUTE CLEAN DEWATERING WATER THROUGH STORMWATER SEDIMENT PONDS. NOTE THAT "SURFACE WATERS OF THE STATE" MAY EXIST ON A CONSTRUCTION SITE AS WELL AS OFF SITE; FOR EXAMPLE, A CREEK RUNNING THROUGH A SITE.
c. OTHER DEWATERING TREATMENT OR DISPOSAL OPTIONS MAY INCLUDE:
i. INFILTRATION
ii. TRANSPORT OFF SITE IN A VEHICLE, SUCH AS A VACUUM FLUSH TRUCK, FOR LEGAL DISPOSAL IN A MANNER THAT DOES NOT POLLUTE STATE WATERS.
iii. ECOLOGY-APPROVED ON-SITE CHEMICAL TREATMENT OR OTHER SUITABLE TREATMENT TECHNOLOGIES (SEE S9.D.9.I. REGARDING CHEMICAL TREATMENT WRITTEN APPROVAL).
iv. SANITARY OR COMBINED SEWER DISCHARGE WITH LOCAL SEWER DISTRICT APPROVAL, IF THERE IS NO OTHER OPTION.
v. USE OF A SEDIMENTATION BAG WITH DISCHARGE TO A DITCH OR SWALE FOR SMALL VOLUMES OF LOCALIZED DEWATERING.
vi. PERMITTEES MUST HANDLE HIGHLY TURBID OR CONTAMINATED DEWATERING WATER SEPARATELY FROM STORMWATER.

ELEMENT 11 - MAINTAIN BMPS

a. PERMITTEES MUST MAINTAIN AND REPAIR ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL BMPS AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION IN ACCORDANCE WITH BMP SPECIFICATIONS.
b. PERMITTEES MUST REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL BMPS WITHIN 30 DAYS AFTER ACHIEVING FINAL SITE STABILIZATION OR AFTER THE TEMPORARY BMPS ARE NO LONGER NEEDED.

ELEMENT 12 - MANAGE THE PROJECT

a. PHASE DEVELOPMENT PROJECTS TO THE MAXIMUM DEGREE PRACTICABLE AND TAKE INTO ACCOUNT SEASONAL WORK LIMITATIONS.
b. INSPECTION AND MONITORING - INSPECT, MAINTAIN AND REPAIR ALL BMPS AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. CONDUCT SITE INSPECTIONS AND MONITORING IN ACCORDANCE WITH SPECIAL CONDITION S4.
c. MAINTAINING AN UPDATED CONSTRUCTION SWPPP - MAINTAIN, UPDATE, AND IMPLEMENT THE SWPPP IN ACCORDANCE WITH SPECIAL CONDITIONS S3, S4 AND S9.

ELEMENT 13 - PROTECT LOW IMPACT DEVELOPMENT (LID) BMPS

a. THE PRIMARY PURPOSE OF LID BMPS/ON-SITE LID STORMWATER MANAGEMENT BMPS IS TO REDUCE THE DISRUPTION OF THE NATURAL SITE HYDROLOGY. LID BMPS ARE PERMANENT FACILITIES.
b. PERMITTEES MUST PROTECT ALL BIORETENTION AND RAIN GARDEN FACILITIES FROM SEDIMENTATION THROUGH INSTALLATION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL BMPS ON PORTIONS OF THE SITE THAT DRAIN INTO THE BIORETENTION AND/OR RAIN GARDEN FACILITIES. RESTORE THE FACILITIES TO THEIR FULLY FUNCTIONING CONDITION IF THEY ACCUMULATE SEDIMENT DURING CONSTRUCTION. RESTORING THE FACILITY MUST INCLUDE REMOVAL OF SEDIMENT AND ANY SEDIMENT-LADEN BIORETENTION/RAIN GARDEN SOILS, AND REPLACING THE REMOVED SOILS WITH SOILS MEETING THE DESIGN SPECIFICATION.
c. PERMITTEES MUST MAINTAIN THE INFILTRATION CAPABILITIES OF BIORETENTION AND RAIN GARDEN FACILITIES BY PROTECTING AGAINST COMPACTION BY CONSTRUCTION EQUIPMENT AND FOOT TRAFFIC. PROTECT COMPLETE LAWN AND LANDSCAPED AREAS FROM COMPACTION DUE TO CONSTRUCTION EQUIPMENT.
d. PERMITTEES MUST CONTROL EROSION AND AVOID INTRODUCING SEDIMENT FROM SURROUNDING LAND USES ONTO PERMEABLE PAVEMENTS. DO NOT ALLOW MUDDY CONSTRUCTION EQUIPMENT ON THE BASE MATERIAL OR PAVEMENT. DO NOT ALLOW SEDIMENT-LADEN RUNOFF ONTO PERMEABLE PAVEMENTS.
e. PERMITTEES MUST CLEAN PERMEABLE PAVEMENTS FOULED WITH SEDIMENTS OR NO LONGER PASSING AN INITIAL INFILTRATION TEST USING LOCAL STORMWATER MANUAL METHODOLOGY OR THE MANUFACTURER'S PROCEDURES.
f. PERMITTEES MUST KEEP ALL HEAVY EQUIPMENT OFF EXISTING SOILS UNDER LID FACILITIES THAT HAVE BEEN EXCAVATED TO FINAL GRADE TO RETAIN THE INFILTRATION RATE OF THE SOILS.

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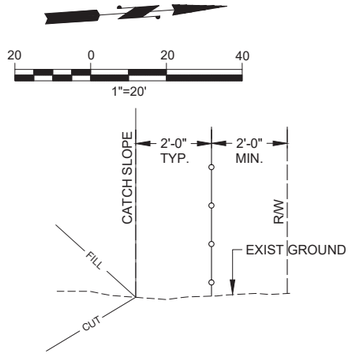
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TEMPORARY EROSION AND SEDIMENT CONTROL NOTES

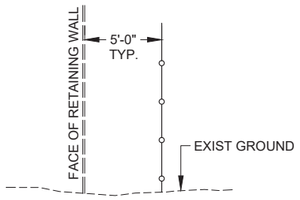
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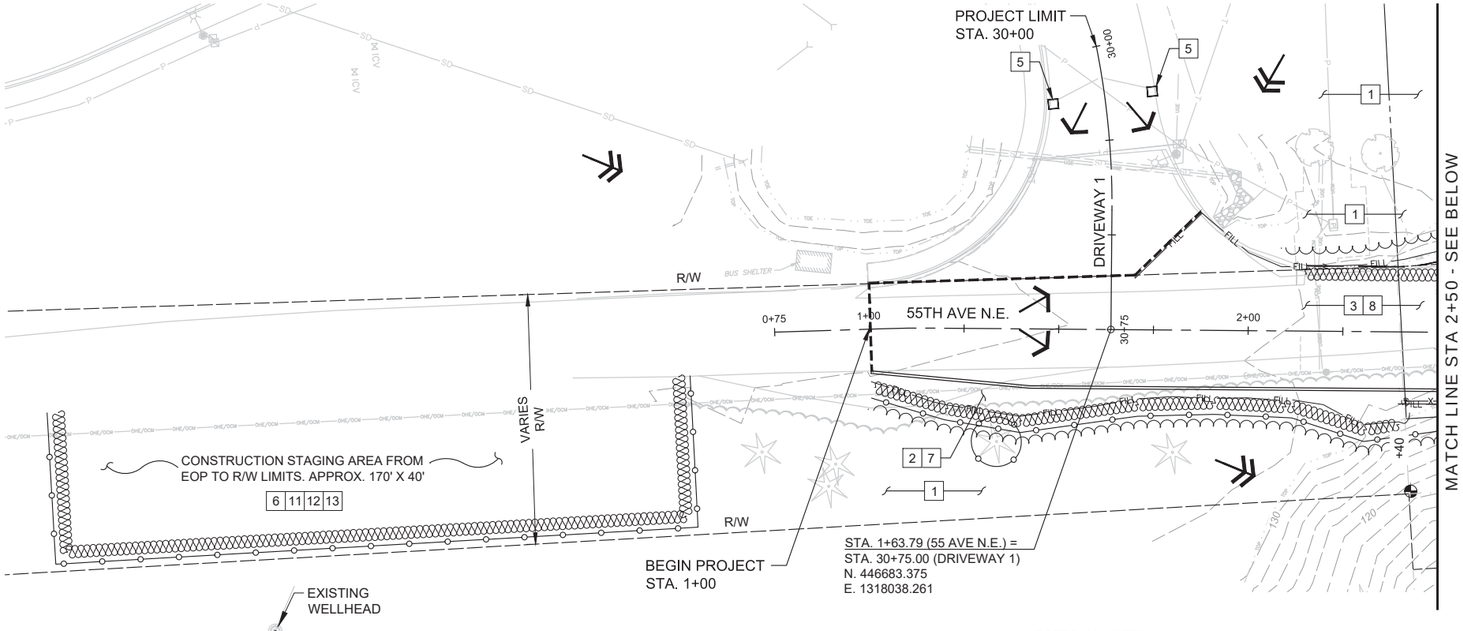
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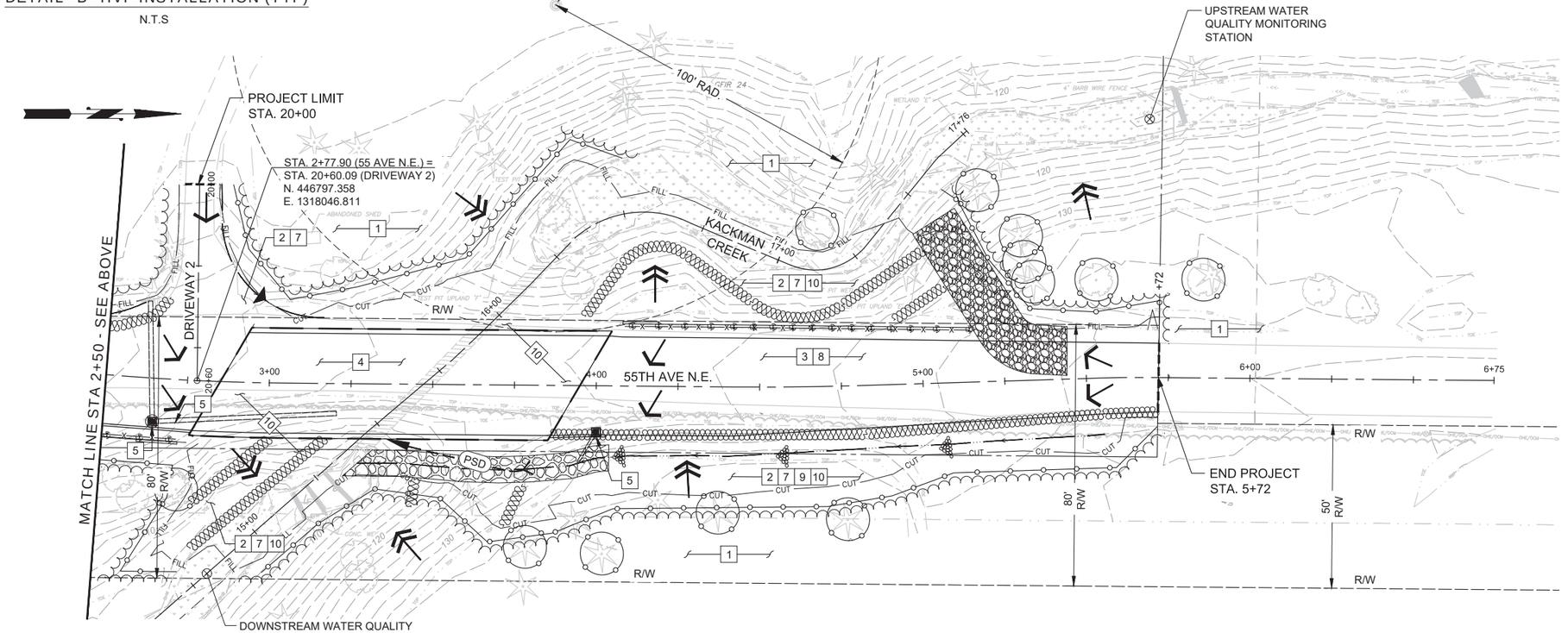
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DETAIL "B" HVF INSTALLATION (TYP)

N.T.S





GENERAL NOTES:

1. REFER TO THE WASHINGTON STATE DOE STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON, CURRENT EDITION, FOR ADDITIONAL TESC INSTALLATION & LAYOUT REQUIREMENTS.
2. FOR ALL AREAS OF DISTURBANCE WITHIN THE 100 FT RIPARIAN BUFFER, PERMANENT RESTORATION SHALL OCCUR IN ACCORDANCE WITH THE "PLANTING PLANS" PER THESE PLANS AND THE SPECIAL PROVISIONS.
3. SEE DRAWING G1.01 FOR ABBREVIATIONS AND LEGEND.

XX CONSTRUCTION NOTES:

1. PRESERVE EXISTING VEGETATION (BMP C101)
2. SEEDING, MULCHING, & AMENDED TOPSOIL (BMP C120, C121 & C125)
3. STREET CLEANING (BMP C140)
4. CONCRETE HANDLING (BMP C151)
5. STORM DRAIN INLET PROTECTION (BMP C220)
6. MATERIALS ON HAND (BMP C150)
7. SURFACE ROUGHENING (BMP C130)
8. DUST CONTROL (BMP C140)
9. GRASS LINED CHANNEL (BMP C201)
10. NETS AND BLANKETS FOR LINING SLOPES 2:1 AND STEEPER (BMP C122)
11. MATERIAL DELIVERY, STORAGE AND CONTAINMENT (BMP C153)
12. CONSTRUCTION STAGING / PARKING AREA STABILIZATION W / BARK MULCH (BMP C107)
13. PLASTIC COVERING (BMP C123)

LEGEND

- HIGH VISIBILITY FENCE (HVF) (BMP C103). SEE DETAILS EC-A & EC-B
- STABILIZED CONSTRUCTION ENTRANCE (BMP C105)
- SAWCUTTING LIMITS (BMP C152)
- TEMPORARY PIPE SLOPE DRAIN 12" Ø (BMP C204)
- PERMANENT ROCK CHECK DAM (BMP C207)
- TRIANGULAR SILT DIKE (BMP C208)
- INLET PROTECTION (BMP C220)
- HIGH VISIBILITY SILT FENCE (BMP C233). SEE DETAIL EC-A
- STRAW WATTLES (BMP C235) SIZE AND SPACED AS NEED FOR SITE CONDITIONS
- LIMITS OF VEGETATION REMOVAL
- PROPOSED DITCH
- DRAINAGE FLOW DIRECTION ARROWS (SHEET FLOW, OR SHALLOW CHANNEL FLOW) ON ROADWAY
- DRAINAGE FLOW DIRECTION ARROWS (SHEET FLOW, OR SHALLOW CHANNEL FLOW) OFF ROADWAY

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TEMPORARY EROSION AND SEDIMENT CONTROL PLAN 1

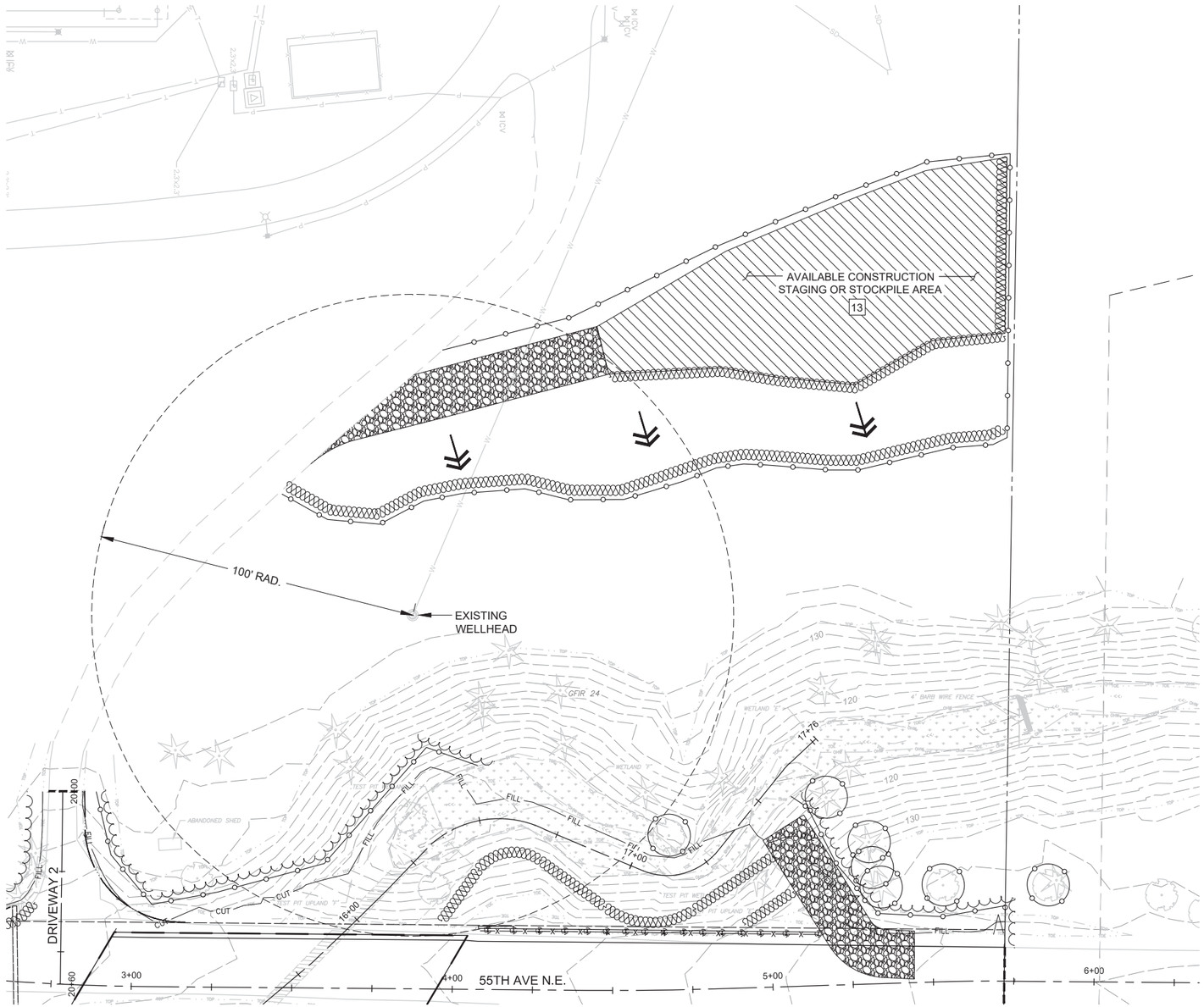
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TEMPORARY EROSION AND SEDIMENT CONTROL PLAN 2

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APPENDIX C

Cultural Resources Report, Monitoring and Inadvertent Discovery Plan

Monitoring and Inadvertent Discovery Plan, Stillaguamish Village Phase I – Kackman Bridge Replacement Project

Snohomish County, Washington



Cardno
Shaping the Future

Monitoring and Inadvertent Discovery Plan

Prepared for	Stillaguamish Tribe of Indians
Project Name	Stillaguamish Village Phase I – Kackman Bridge Replacement Project
DA Permit No.	NWS-2018-1142
Cardno Project No.	E318302400
Project Manager	Jennifer M. Ferris
Date	April 24, 2019

Prepared for:

Stillaguamish Tribe of Indians
Christopher Boser, Project Lead
Carole Kirk, Land Management Liaison
3233 236th Ave NE
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Arlington, WA 98223

Prepared by:

Michelle M. Hannum, MLitt
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Seattle, WA 98104

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Figure 1. Project area shown on the Arlington West USGS map. Note APE for Kackman Bridge Replacement Project in NE corner of housing project boundary. 2

Figure 2. The APE for the Kackman Creek Bridge Project (outlined in blue) recommended for archaeological monitoring. 3

Acronyms

CFR	Code of Federal Regulations
DA	Department of the Army
DAHP	Department of Archaeology and Historic Preservation
MIDP	Monitoring and Inadvertent Discovery Plan
NRHP	National Register of Historic Places
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Officer

SOI	Secretary of Interior
THPO	(Stillaguamish) Tribal Historic Preservation Officer
USACE	United States Army Corps of Engineers
WAC	Washington Administrative Code
WISAARD	Washington Information System for Architectural and Archaeological Records Data

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1 Introduction

The Stillaguamish Tribe of Indians proposes to construct the Stillaguamish Village, a multi-phase development located on two parcels covering 80 acres of property in Section 34 of Township 32 North, Range 5 East, of the Willamette Meridian, in Arlington, Washington (Figure 1). As part of the housing project, the Stillaguamish Tribe of Indians also proposes to replace the extant culvert that conveys Kackman Creek under 55th Avenue with a bridge. A permit from the U.S. Army Corps of Engineers (USACE) is required for the bridge construction project (NWS-2018-1142), which must comply with Section 106 of the National Historic Preservation Act (NHPA; 16 U.S. Code [USC] 470) and its implementing regulations (36 Code of Federal Regulations [CFR] Part 800), as well as 33 CFR Part 325, Appendix C.

According to the Washington Information System for Architectural and Archaeological Records Data (WISAARD), which is managed by the Department of Archaeology and Historic Preservation (DAHP), the project area is classified as having moderate to high risk for encountering buried archaeological resources. At the request of the Stillaguamish Tribe of Indians, Cardno completed an archaeological resources survey for the Stillaguamish Village project that included the Phase 1 project area and the Area of Potential Effects (APE) for the Kackman Bridge Replacement Project (see Hannum and Ferris 2019). The survey was conducted in compliance with both Section 106 of the NHPA and state regulations including the Washington State Environmental Policy Act (SEPA) (Revised Code of Washington [RCW] 43.21C) and implementing rules contained in Washington Administrative Code (WAC) 197-11. No cultural resources were identified during the survey.

Due to the history of the area, proximity of known archaeological resources, and potential for encountering cultural materials during ground disturbance, Cardno, in coordination with the Stillaguamish Tribal Historic Preservation Officer (THPO), recommended that a MIDP be developed to minimize potential impacts to any unknown archaeological resources for the project and be implemented during all ground-disturbing activities (Hannum and Ferris 2019). Ground-disturbing activities include grubbing and excavation for bridge abutments. The monitor should be a professional archaeologist who meets the Secretary of the Interior's (SOI's) professional qualifications standards (36 CFR Part 61) for archaeology or a qualified archaeologist supervised by a SOI-qualified archaeologist.

The following Monitoring and Inadvertent Discovery Plan (MIDP) outlines the procedures to follow, in accordance with Section 106 of the NHPA. This plan contains the necessary steps to minimize damage to any inadvertently discovered archaeological resources during any ground-disturbing activities, which may include small, deeply buried, and/or widely dispersed historic or pre-contact cultural materials, human remains, funerary objects, and objects of cultural patrimony. Cultural resources include objects modified by humans and locations of human activity, occupation, or use, including locations (sites or places) of traditional, religious, and cultural importance to specified social and/or cultural groups.

A cultural resource discovery could consist of, but is not limited to:

- Pre-contact features (e.g., hearths, occupational surfaces, middens, charcoal stains)
- Pre-contact artifacts (e.g., debitage, projectile points, shell)
- Historic features (e.g., wells, railroad berms, foundations)
- Historic artifacts (e.g., glass bottles, sanitary cans, bricks, lumber, nails, railroad ties)
- Burials and funerary items (including, but not limited to skeletal remains, headstones, coffin wood fragments, burial goods [e.g., pipes, pottery, ornaments]).

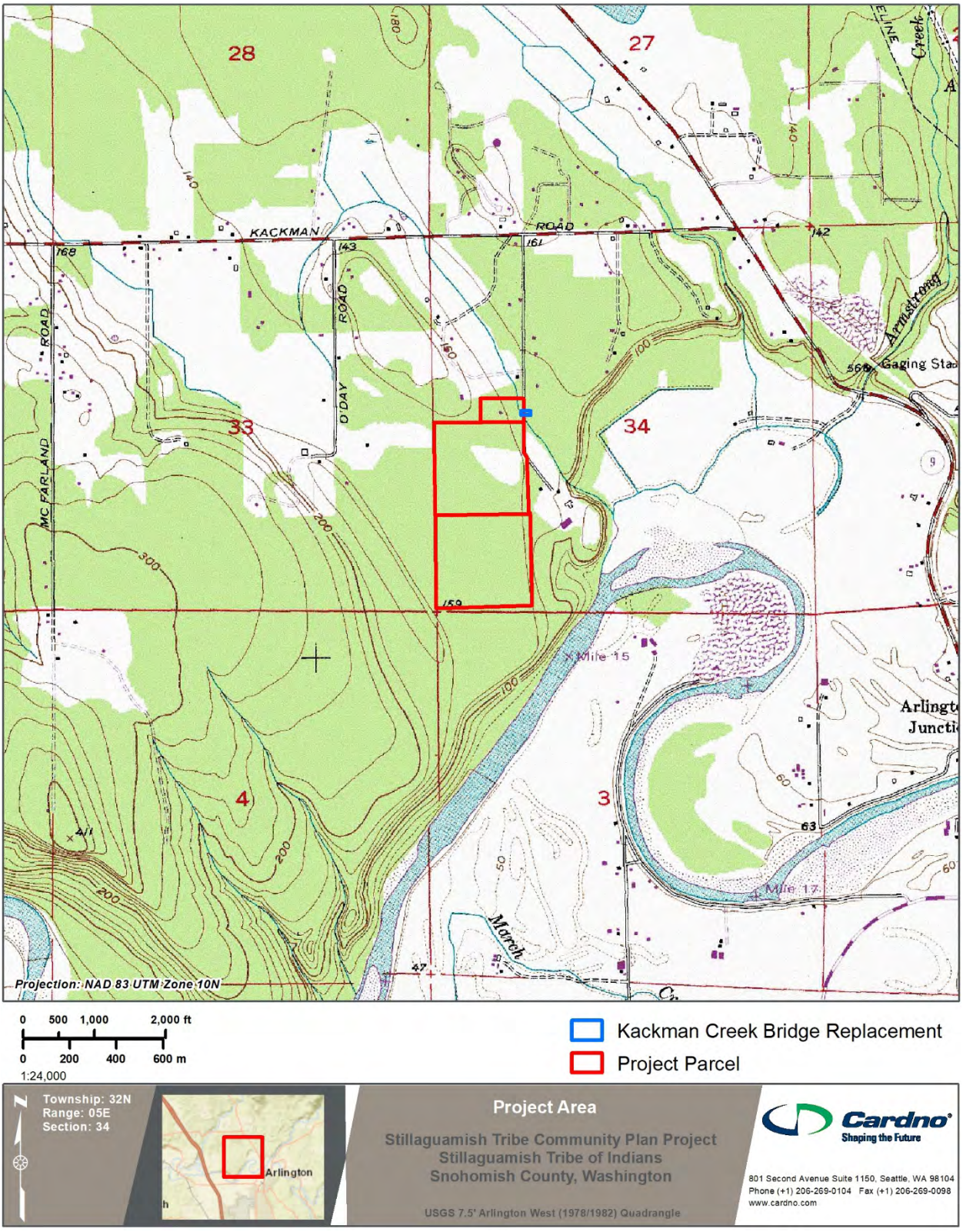


Figure 1. Project area shown on the Arlington West USGS map. Note APE for Kackman Bridge Replacement Project in NE corner of housing project boundary.

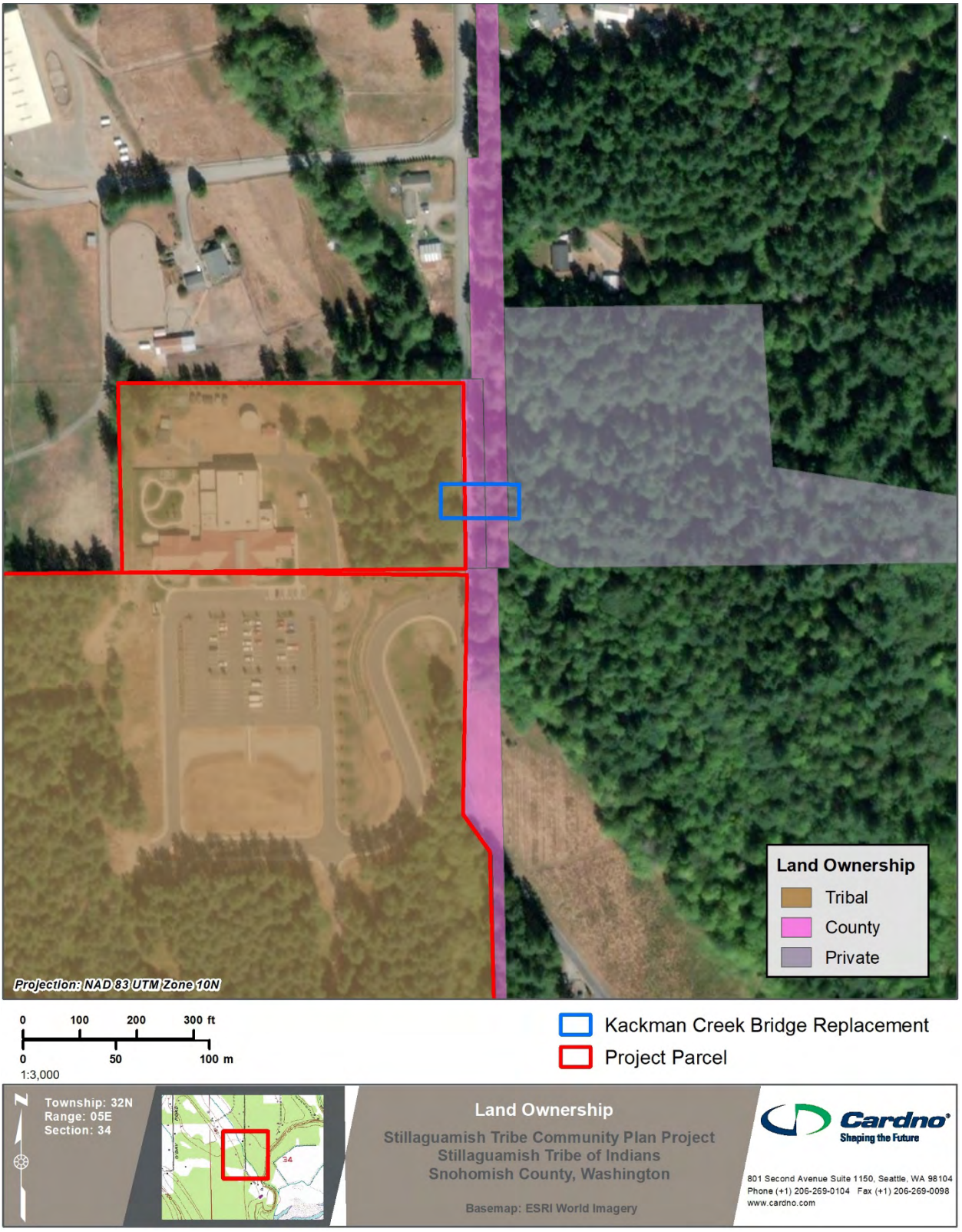


Figure 2. **The APE for the Kackman Creek Bridge Project (outlined in blue) recommended for archaeological monitoring.**

2 Monitoring Protocols

The Stillaguamish Tribe of Indians will retain a professional archaeologist to monitor the ground-disturbing activities related to project construction. A tribal monitor from the Stillaguamish THPO may also monitor ground-disturbing activities. The archaeological and tribal monitors will coordinate for the duration of the monitoring.

2.1 Qualifications and Training

The archaeological monitor will be required to meet the SOI standards (36 CFR Part 61) or will be supervised by an archaeologist who meets the SOI standards. The monitor will follow the safety protocols set forth by the Stillaguamish Tribe of Indians Project Manager and/or construction manager while on-site and will follow strict communication protocols while on-site. The monitor will work collaboratively with the Stillaguamish Tribe of Indians' project manager in an advisory role to achieve compliance with this MIDP.

The monitor will be required to attend the pre-construction training as coordinated by the Stillaguamish Tribe of Indians' contractor or subcontractor prior to any monitoring activity. Section 4 discusses the pre-construction meeting that will be coordinated with the monitor to inform the contractor and its employees as to what constitutes an unanticipated find and what steps are to be taken in the event of an inadvertent discovery.

At the start of each work day, the monitor will report to the Stillaguamish Tribe of Indians' project manager and/or construction manager to receive daily safety and information briefings.

2.2 Monitoring Procedures

The monitor will seek to identify potential buried surfaces, anthropogenic sediments, and previously unidentified archaeological features or artifact-bearing strata during ground-disturbing activities. The monitor will inspect all disturbed areas and the recovered soil or sediment for indications of such archaeological resources. If ground-disturbing activities are planned in multiple locations, additional monitors will be on-site to monitor those areas.

Ground-disturbing activities include grubbing and any subsurface component of abutment and footing construction or culvert replacement. Monitoring will continue until ground-disturbing activities are complete. However, the construction schedule will dictate when ground disturbance is occurring and, therefore, when the monitor is needed. The schedule for ground disturbance may be intermittent during the course of the planned construction, and the monitor will be on-site only during ground-disturbing activities, which will be confirmed through the Stillaguamish Tribe of Indians' project manager and/or construction manager.

The monitor will stand in close proximity to heavy equipment in order to view subsurface deposits as they are exposed, making all reasonable efforts to ensure safety and noninterference. The monitor will be in close communication with the Stillaguamish Tribe of Indians' project manager and/or construction manager and equipment operators to ensure adequate opportunity for observation and documentation.

The monitor will maintain a daily log documenting what construction activities were monitored, descriptions and provenience of any archaeological discoveries or artifacts collected, and other pertinent information. The monitor will take digital photographs of each monitoring location and any cultural resources encountered.

Should potentially significant resources be found, the monitor would communicate with the Stillaguamish Tribe of Indians' project manager and/or construction manager, who would have the authority to halt

construction activities until the discovery is evaluated. Guidelines for steps to follow in case of inadvertent discovery of archaeological resources and human remains are presented in Section 3.

The monitor may examine excavated spoils in the course of excavation activities. If cultural materials are observed in spoils piles, these materials would be removed for further examination. It is expected that the opportunity to screen spoil soil or sediment would be available. If cultural materials are encountered in the spoils piles, the monitor will communicate with the Stillaguamish Tribe of Indians' project manager and/or construction manager to halt all ground-disturbing activity within 50 feet of the original location of the discovery, and the procedures outlined in Section 3 will be followed.

2.3 Construction Continuation

Work outside the discovery location may continue while documentation and assessment of the unanticipated find proceed as long as there is another monitor present.

If the discovery is determined to be an isolated artifact or recent deposit, construction may resume once cleared by the monitor in coordination with the USACE, DAHP, and Stillaguamish THPO.

If the discovery is determined to be an archaeological site or human burial, construction may resume only after the steps outlined in Section 3 are followed.

Construction may continue at the discovery location only after the processes outlined in this plan and Section 3 are followed and compliance with federal laws is complete.

2.4 Consulting Party Involvement

Consulting Parties include the USACE, DAHP, and the Stillaguamish Tribe of Indians, listed in Section 6. The monitor will send email notification to all Consulting Parties with the construction start date at least one week prior to construction. Along with providing a schedule of monitoring and invitation to attend the pre-construction meeting, Consulting Parties will be invited to observe construction activities. If a Consulting Party wishes to observe the construction activities, they will be required to complete any safety training required by the contractor and subcontractor. Any Consulting Party who observes construction will also be required to wear appropriate PPE, which will not be provided by the contractor or subcontractor.

3 Guidelines for the Inadvertent Discovery of Archaeological Resources and Human Remains

3.1 Procedures for the Discovery of Archaeological Materials

If the monitor identifies an unanticipated discovery or any Stillaguamish Tribe of Indians employee or contractor suspects the inadvertent discovery of an archaeological resource, all ground-disturbing, construction or other activities around the immediate area of the discovery shall cease. Steps will be taken to mark the area of the discovery and stabilize and protect the discovered resource until it can be evaluated. Efforts shall be made to protect the discovery from looting and vandalism.

1. A 50-foot (ft) perimeter will be implemented around the inadvertent discovery. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed following provisions for treating cultural material as set forth in this plan. The construction supervisor may direct work away from cultural resources to work in other areas prior to contacting the concerned parties.
2. Upon discovery, the monitor, in collaboration with Stillaguamish Tribe of Indians Project Manager will contact the USACE archaeologist via email and/or telephone to inform them of the find and seek guidance as expeditiously as possible.
3. The monitor will conduct an initial evaluation of the resource immediately.
4. If the discovery is determined not to be archaeological, work may proceed without further delay.
5. If the discovery is determined to be archaeological, the monitor will contact the Stillaguamish Tribe of Indians, Stillaguamish THPO, and DAHP via telephone call and email to inform them of the find and seek guidance as expeditiously as possible. If applicable, a photo of the discovery will be included in the notification. The monitor will document and preliminarily assess the find and formulate a recommendation regarding whether the discovery constitutes an isolated find or an archaeological site.
6. If the discovery is an archaeological site, the monitor will prepare the documentation and conduct preliminary assessment of National Register of Historic Places (NRHP) eligibility and in anticipation of any permits that may be required. A determination of eligibility for listing in the NRHP by the USACE in consultation with the Stillaguamish THPO and DAHP must be obtained. It is presumed that cultural resources are eligible for listing in the NRHP until and unless the USACE, in consultation with the Stillaguamish THPO and DAHP, makes a determination that the identified resource is not eligible.
7. The monitor will record the discovery on a State of Washington inventory form. Site overviews, features, and artifacts will be photographed, and stratigraphic profiles and soil/sediment descriptions will be prepared for subsurface exposures. Discovery locations will be documented on scaled site plans and site location maps.
8. The USACE, DAHP, and Stillaguamish THPO will consult to determine appropriate treatment including, but not limited to, photography, mapping, and sampling. Cultural features, horizons, and artifacts detected in buried sediments may require further evaluation using hand-excavated test units.
9. In the case of an isolated archaeological find, construction excavation will likely not halt for more than the time required by the monitor to photograph and record details of the location (e.g., depth

below the ground surface, sedimentary context) and other pertinent information about the isolated find. Construction excavation may resume in the area when the USACE and DAHP, in coordination with the monitor, have notified the Stillaguamish Tribe of Indians' project manager and/or construction manager that this work is complete and that construction may resume.

10. All pre-contact and historic artifacts collected from the surface and/or construction excavations will be analyzed in the field and cataloged by the professional archaeologist. The disposition of cultural materials will be determined in consultation with Stillaguamish THPO, USACE, and DAHP.

3.2 Procedures for the Discovery of Human Remains, Funerary Objects, and Objects of Cultural Patrimony

1. If any Stillaguamish Tribe of Indians employee or contractor suspects the inadvertent discovery of an unmarked burial grave or unregistered grave, funerary object, or object of cultural patrimony, all ground-disturbing, construction, or other activities around the immediate area of the discovery will cease within a 100-ft radius of the point of discovery.
2. Upon discovery, the monitor, Stillaguamish Tribe of Indians employees, contractors, and USACE will comply with applicable laws and regulations including RCW Chapter 27.44, Indian Graves and Records, and RCW Chapter 68.60 Section 68.60.050, Protection of Historic Graves.
3. The monitor will take steps to mark the area of the discovery and stabilize and protect the discovered resource until it can be evaluated. Efforts will be made to protect the discovery from looting and vandalism. The discovery will not be removed or otherwise disturbed.
4. The monitor and/or the construction manager will immediately notify the Stillaguamish Tribe of Indians' project manager and USACE of the discovery via telephone.
5. The monitor will observe the discovery immediately without causing further disturbance.
6. The monitor will ensure that any and all human remains, sacred objects, and objects of cultural patrimony will be treated with dignity and respect. Remains will be covered with a tarp or other materials (not soil or rocks) for temporary protection in place and to shield them from being photographed.
7. Stillaguamish Tribe of Indians and the monitor will notify the Arlington Police, Snohomish County Medical Examiner, DAHP, and the Stillaguamish THPO in the most expeditious manner possible.
8. The Arlington Police and Snohomish County Medical Examiner will be asked to determine whether the remains are forensic or nonforensic, which will be completed within 5 business days of receiving notification.
    a. The coroner will retain jurisdiction over forensic remains.
    b. If the medical examiner determines the remains are non-forensic, they will report that finding to the DAHP.
9. The state physical anthropologist will make an initial determination of whether nonforensic skeletal human remains are Indian or non-Indian to the extent possible based on the remains within 2 business days of notification of a finding of such nonforensic remains. If the remains are determined to be Indian, the DAHP will notify the Stillaguamish Tribe of Indians via certified mail to the head of the appropriate tribal government within 2 business days and contact the appropriate tribal cultural resources staff.
10. The Stillaguamish Tribe of Indians have 5 business days to respond via telephone or writing to the DAHP as to their interest in the remains. The DAHP will handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

11. Stillaguamish Tribe of Indians and contractor will resume project-related activities in the area of the discovery upon receipt of written authorization from either the medical examiner or the DAHP, whoever has jurisdiction under state law.

3.3 Proceeding with Work

Work outside the discovery location may continue while documentation and assessment of the cultural resource proceeds; however, all ground-disturbing activity will need to be monitored by an archaeologist. Construction may continue at the discovery location only after the process outlined in this plan is followed and compliance with federal and state laws is complete.

4 Pre-Construction Meeting

All contractor and subcontractor construction personnel will meet with the monitor for training and orientation prior to the start of any ground-disturbing construction activities. The training will be developed by the monitor. New construction personnel added after construction begins will be trained before working on-site. A list of trained personnel will be kept by the archaeologist.

During the pre-construction meeting, all construction personnel will be trained as to what constitutes cultural resources and unanticipated finds. The meeting will also inform the construction personnel what steps are to be taken in the event of an inadvertent discovery as outlined in this plan in Section 3. All construction personnel will be instructed to alert the monitor if they suspect an unanticipated discovery.

5 Reporting

The monitor will be required to maintain daily notes and photographs that describe the areas monitored. The notes will describe methods used, findings, evaluations of the cultural materials recovered, any additional interpretation of the materials recovered, and coordination efforts in compliance with Section 3. The monitor will also provide a weekly email summary to the Consulting Parties detailing the activities monitored and any observed cultural resources for weeks when monitoring occurs.

Upon completion of monitoring, the monitor will prepare a letter report that summarizes the methods and results of the monitoring, illustrated with maps, drawings, and photographs, as appropriate. The written daily notes will be summarized in the letter report. The report will be provided to the Stillaguamish Tribe of Indians' project manager for review prior to submission to the USACE and DAHP. A final PDF of the report will be provided to the Consulting Parties. Depending upon discoveries, the contents of the reports may be confidential and may not be available for public disclosure.

6 Contact Information

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Arlington Police Department
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Tribal Monitor

Stillaguamish Tribe of Indians THPO staff

Archaeological Monitor – TBD

7 References Cited

Hannum, Michelle M., and Ferris, Jennifer M.
2019 *Final Stillaguamish Village, Phase I, Project Cultural Resources Technical Report.* Cardno, Seattle. Report prepared for Stillaguamish Tribe of Indians, Arlington, Washington.

APPENDIX D

Geotechnical Report

GEOTECHNICAL ENGINEERING REPORT KACKMAN CREEK 55TH AVE. CULVERT REPLACEMENT AND ROADWAY WIDENING

Snohomish County, Washington

Prepared for: Herrera Environmental Consultants

Project No. 160073 • February 3, 2020

Aspect CONSULTING

earth + water

GEOTECHNICAL ENGINEERING REPORT
KACKMAN CREEK 55TH AVE. CULVERT REPLACEMENT AND ROADWAY WIDENING

Snohomish County, Washington

Prepared for: Herrera Environmental Consultants

Project No. 160073 • February 3, 2020

Aspect Consulting, LLC



February 3, 2020

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1 Introduction

This report presents the results of geotechnical engineering studies performed by Aspect Consulting, LLC (Aspect) in support of the Kackman Creek 55th Avenue Culvert Replacement and Roadway Widening (Project) in Snohomish County, Washington (Site).

The Project location is shown on Figure 1, Site Location Map. The purpose of the Project is to replace an existing corrugated metal pipe (CMP) culvert and regrade Kackman Creek to improve hydraulic capacity and habitat. The culvert will be replaced with a single-span bridge. The existing two-lane roadway will be widened to satisfy current Snohomish County (County) standards.

This report summarizes the results of the completed field explorations and presents Aspect's geotechnical engineering conclusions and recommendations for the new bridge, approach fills, and related retaining walls.

1.1 Project Description

The existing dead-end 55th Avenue roadway provides access to the Stillaguamish Tribal Community Center and a few private residences. The roadway passes over Kackman Creek, which is considered by the Washington Department of Fish and Wildlife (WDFW) to be a fish-bearing creek. The creek is conveyed under the roadway embankment through a 48-inch-diameter CMP culvert, which has deformed to an oval shape and is believed to be at or near the end of its service life. The current stream alignment runs at a significant skew of approximately 45-degrees relative to the roadway alignment.

At the creek crossing, the existing roadway embankment is about 15 to 20 feet tall. The embankment side slopes are oversteepened and marginally stable. Pavement distress in the form of longitudinal and arc-shaped cracks are present on the east side of the road to the south of the culvert and on the west side of the road to the north of the culvert. A shallow skin slide is reported to have occurred on the east side of the road to the south of the culvert within the last 5 years. Stream scour/erosion at the toe of the embankment is believed to be actively destabilizing the west roadway shoulder north/upstream of the culvert.

A 110-foot-long, single-span bridge structure is proposed to replace the existing culvert. The stream will be regraded and realigned to reduce abutment skew to approximately 30 degrees. At the bridge approaches, the roadway will be widened to about 30 feet. Sliver fills required over the existing embankment side slopes will need to be retained with structural walls.

Much of the roadway widening will be completed toward the east, and thus, the roadway centerline will shift slightly in that direction. The roadway vertical profile will be raised by about a foot at the north approach.

The existing roadway must remain open to traffic throughout construction and thus, staged construction will be necessary. Work below the ordinary high water (OHW) elevation will be restricted the allowable 'in-water' work window as determined by the applicable governing agencies.

We assume that design and construction of the improvements will be in accordance with the current American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications (BDS) (AASHTO, 2017) and/or the Washington State Department of Transportation (WSDOT) Bridge Design Manual (WSDOT, 2018a).

The Project vertical datum is NAVD88 and the basis for all references to elevations (also Elevation) contained herein.

Aspect's previous work for the Project includes a geotechnical reconnaissance memo (Aspect, 2016) and a preliminary geotechnical engineering evaluation (Aspect, 2017) that provided conceptual type, size, and location (TS&L)-level geotechnical engineering recommendations for foundation support for a bridge or box/arch culvert structure. This geotechnical engineering report provides geotechnical engineering design and construction recommendations to inform final design.

2 Site Conditions

2.1 Surface

Site surface conditions generally consist of a two-lane paved road, road embankment side slopes, the existing CMP culvert, and creek channel side slopes created by creek incision. Site topography is shown on Figure 2.

2.2 Subsurface Conditions

Subsurface conditions at the Site were inferred from our review of geologic literature and subsurface explorations consisting of four hollow-stem auger borings (designated B-1 through B-4) completed at the Site. The borings were advanced within the Enselman Road right-of-way at the locations shown on Figure 2. A detailed description of the drilling and sampling methods used in the borings is provided in Appendix A.

2.2.1 General Geology

The *Geologic Map of the Arlington 7.6 Minute Quadrangle, Snohomish County, Washington* (Minard, 1985) indicates the Site is underlain by recessional outwash (Qvr). The Qvr unit is described as stratified outwash sand and gravel deposited by meltwater streams from the stagnating and receding glacier during the most recent glaciation of the Puget Sound region between about 15,000 and 20,000 years ago. The recessional outwash is not glacially overridden and is typically in a medium dense configuration.

Vashon till (Qvt) underlies the Qvr unit stratigraphically and is mapped nearby in the creek drainage upstream of the Site. The Qvt unit is described as a glacial diamict of sand, gravel and silt deposited directly beneath the glacial ice during the most recent glaciation of Puget Sound region. The enormous weight of the glacial ice resulted in the Qvt being deposited in a dense/hard configuration.

Although not mapped, recent alluvium deposited by Kackman Creek was observed in the borings as described below.

2.2.2 Stratigraphy

The Site subsurface soils, based on the completed subsurface explorations, can be grouped into four units: fill, recent alluvium, Vashon recessional outwash, and glaciolacustrine deposits. The geologic units encountered in our subsurface explorations are generally consistent with the mapped geology of the Site area described above.

Details of the composition and distribution of these units are presented below, ordered from shallowest to deepest, and the exploration logs are provided in Appendix A. Select soil samples from the borings were submitted for geotechnical laboratory testing. The results of the geotechnical laboratory testing are provided in Appendix B.

Fill

Below the asphalt pavement, we encountered roadway embankment fill in each boring that extended to depths between about 15 and 17 feet below the ground surface (bgs). The fill typically consisted of very loose to loose, slightly moist to moist, slightly sandy, slightly silty GRAVEL (GP-GM), slightly silty SAND (SP-SM), and slightly gravelly to gravelly, silty SAND (SM). The fill has low shear strength and high compressibility.

Recent Alluvium

Below the roadway embankment fill, we encountered recent alluvium that extended to depths between about 20 and 30 feet bgs in the borings. The recent alluvium typically consisted of medium dense to dense, moist to wet, very sandy, slightly silty GRAVEL (GW-GM) and slightly gravelly to gravelly, slightly silty SAND (SP-SM). The recent alluvium has moderate shear strength, moderate compressibility, and variable liquefaction susceptibility.

Vashon Recessional Outwash

Below the recent alluvium, we encountered Vashon recessional outwash that extended to depths of up to about 80 feet bgs in the borings. The Vashon recessional outwash typically consisted of medium dense to dense, wet, slightly gravelly to gravelly SAND (SP) and slightly gravelly to gravelly, slightly silty SAND (SP-SM). The Vashon recessional outwash has moderate shear strength, moderate compressibility, and variable liquefaction susceptibility. Borings B-1 through B-3 were terminated in this unit.

Glaciolacustrine Deposits

We drilled and sampled a deeper boring, B-4, which penetrated the Vashon recessional outwash and encountered glacially consolidated soils at a depth of 80 feet below present roadway elevation. The glacially consolidated soils consisted of hard, slightly moist, low plasticity SILT (ML), which we infer to be a pre-Vashon glaciolacustrine deposit. The glaciolacustrine deposit exhibits high shear strength, low compressibility, and is not susceptible to liquefaction.

2.2.3 Groundwater

A continuous, static groundwater table was encountered between depths of about 18 and 20 feet bgs in the borings, approximately matching with the level of Kackman Creek. Groundwater levels at the Site are expected to fluctuate seasonally with precipitation and water levels in the creek.

3 Seismic Hazard Evaluation

3.1 Seismic Hazards

The Site is located within a region of active tectonic forces associated with the interaction of the offshore Juan de Fuca Plate, the Pacific Plate, and the onshore North American Plate. Seismic hazards include strong ground shaking from earthquakes associated with the Utsalady Point Fault, Strawberry Point Fault, Devils Mountain Fault, Southern Whidbey Island Fault, and the Cascadia Subduction Zone (CSZ).

The Utsalady Point Fault, Strawberry Point Fault, Devils Mountain Fault, and Southern Whidbey Island Faults are east-west shallow crustal faults that are estimated to be capable of producing earthquakes of magnitudes between 6.5 and 7.5.

The CSZ lies along the boundary of the converging oceanic plates (Juan de Fuca and Pacific Plates) and continental plate (North American Plate). CSZ earthquakes occur due to rupture between the subducting oceanic plate and the overlying continental plates. The CSZ can produce earthquakes up to magnitude 9.3, and the recurrence interval is thought to be on the order of about 500 years. The most recent subduction zone earthquake occurred about 300 years ago.

In response to strong ground shaking at the Site, the relatively loose soils below groundwater could liquefy and experience significant strength loss, which could result in ground deformations such as vertical settlement at the ground surface, lateral ground movement towards the creek, and embankment slope instability. An evaluation of the seismic hazards at the Site are presented in the following sections.

3.1.1 Code-Based Ground Motion Parameters

Seismic design for the new bridge will be for a ground motion with a 7 percent probability of exceedance in 75 years, or a return period of 975 years, in accordance with the 2011 AASHTO *Guide Specifications for LRFD Seismic Bridge Design* (AASHTO, 2011). The effects of site-specific subsurface conditions on the bedrock ground motion are expressed in terms of the "site class." The site class can be correlated to the average standard penetration resistance (N-value) or average shear wave velocity in the upper 100 feet of the soil profile. Based on the subsurface explorations completed at the Site, and assuming the bridge will be designed to mitigate the potential effects of liquefaction, the soil profile would classify as Site Class D. The recommended ground motion parameters, adjusted for Site Class D, are provided in Table 1.

Table 1. Recommended Ground Motion Parameters

Ground Motion Parameter	Recommended Value
Site Class	D– "Stiff Soil"
Short Period Spectral Acceleration, S_s (g)	0.75
1-Second Period Spectral Acceleration, S_1 (g)	0.26
Site Coefficient (F_a)	1.12
Site Coefficient (F_v)	1.89
Design Short Period Spectral Acceleration, S_{DS} (g)	0.90
Design 1-Second Period Spectral Acceleration, S_{D1} (g)	0.48
Site-Adjusted Peak Ground Acceleration (g)	0.39
Design Earthquake Magnitude (M_w)	7.1

Note: Parameters based on the latitude and longitude of the Site: 48.217794°N, 122.155744°W

3.1.2 Liquefaction Susceptibility

Liquefaction occurs when loose, saturated, and relatively cohesionless soil deposits temporarily lose strength and stiffness as a result of earthquake shaking. Potential effects of soil liquefaction include temporary loss of shallow foundation bearing capacity, loss of deep foundation axial and lateral capacity, vertical ground settlement, creekbank slope failure, and lateral ground movement towards creek banks or shoreline areas—any of which could result in structural damage. Primary factors controlling the triggering of liquefaction include intensity and duration of strong ground motion, characteristics of subsurface soils, *in situ* stress conditions, and the depth to groundwater.

We evaluated the potential for the triggering of liquefaction by ground shaking from the design ground motion using the data collected in the borings and the WSDOT WSliq software program (WSDOT, 2009). We used the "WSDOT Recommended" model within the Multiple Scenario[1] approach in WSliq to predict the triggering of liquefaction.

The results indicate zones of medium dense alluvium and Vashon recessional outwash below the groundwater table could liquefy. The depths and corresponding elevations where liquefaction could occur are shown in Table 2.

[1] The Multiple Scenario approach considers all combinations of earthquake magnitude and distance (M-R) that contribute to the specified ground motion and uses the deterministic models available within WSliq to predict the soil layers where liquefaction will trigger. The WSDOT Recommended model assigns weighting factors (determined by the WSliq developer) to the results of the deterministic models and combines the weighted results.

Table 2. Estimated Depths and Elevations where Liquefaction Could Occur

Boring	Boring Depth (feet)	Depths [Elevations] where Liquefaction Could Occur (feet)	Total Thickness of Liquefiable Soils (feet)
B-1	46.5	35 – 45 [92 – 82]	10
B-2	41.5	30 – 35 [99 – 94]	5
B-3	55	30 – 45 [96 – 81]	15
B-4	81.5	45 – 60, 65 – 70 [81 – 66, 61 – 56]	20

Based on the results of the liquefaction analysis and our understanding of the currently proposed final site grades, we have assumed an average design profile of 35 feet of non-liquefiable crust, over 20 feet of liquefiable soils, over non-liquefied soil for the purposes of analyzing laterally loaded piles under fully liquefied conditions and calculating liquefaction-induced downdrag loads.

3.1.3 Liquefaction-Induced Ground Deformation

3.1.3.1 Liquefaction-Induced Flow Failure

We assessed the potential for liquefaction-induced flow failures of the embankment slopes at the bridge abutments using the results of our liquefaction analyses, grading information at the abutments provided by the design team, and the computer program Slide (Rocscience, 2018). Flow failures are characterized by large displacements of liquefied soil or blocks of intact material riding on liquefied soil. Flow failures occur when static shear stresses exceed the shear strength of the fully liquefied soils.

The shear strength of the liquefied soils (i.e., residual strengths) were estimated using semi-empirical methods within WSliq. The results indicate flow failure at the abutments is unlikely. With this, we conclude that flow failure is not a design consideration at the Site.

3.1.3.2 Lateral Spreading

Lateral spreading is characterized by displacement of non-liquefied crustal soils over a layer of liquefied soil towards a free face or down gentle slopes when a free face is absent (such as the re-graded creek channel slopes for this Project). Lateral spreading occurs cyclically during earthquake shaking as the combination of gravitational forces and inertial forces during earthquake shaking are sufficient to destabilize a mass of soil. Based on the results of the flow failure analyses and the relative depth of potentially liquefiable soils below the abutments, we conclude by inspection that lateral spreading is a not a design consideration at the Site.

3.1.3.3 Ground Settlement

We evaluated potential magnitudes of liquefaction-induced vertical ground settlement using the “WSDOT Recommended” model within the Multiple Scenario approach in

WSliq in accordance with guidance from WSDOT (WSDOT, 2008). The estimated ground deformations are presented in Table 3 and indicate liquefaction-induced vertical settlement at the ground surface could be on the order of 1 to 3 inches.

Table 3. Estimates of Liquefaction-Induced Ground Settlement

Boring	Vertical Settlement (inches)
B-1	1.9
B-2	1.0
B-3	3.1
B-4	1.7

4 Embankment Side Slope Stability

Retaining walls will be required to support the new sliver fills that will be placed on the embankment side slopes to widen the roadway. The existing longitudinal and arc-shape cracks in the existing pavement, the steep side slope configuration, and recent skin slide activity indicate the existing embankment side slopes are marginally stable in their current configuration. We recommend cantilevered soldier pile walls near the bridge structure where retained heights are significant, transitioning to mechanically stabilized earth (MSE) walls, where embankment/creek channel slopes are re-graded to 2H:1V or shallower and retained heights are 4 feet or less.

We used Slide to evaluate the stability of the existing embankment side slopes and to evaluate potential retaining wall types that could retain the new fill and maintain an acceptable factor of safety against global slope instability (i.e., slope failures that pass below the walls). We evaluated global slope stability of embankment side slopes through cross-sections A and B (Figure 2); the thicknesses of the new fill at the cross-section locations were based on grading information provided by the design team. We evaluated global slope stability under static loading conditions.

The soil and material units and engineering properties assumed for our global stability analyses are shown in Table 4 and are based on the data from our subsurface explorations and our experience with materials used in retaining wall construction. For the MSE wall, we modeled a "block" of high shear strength soil to represent the zone of reinforced soils behind the wall face. For the soldier pile wall, we modeled a cantilevered soldier pile with a shear strength of 100 kips and an assumed center-to-center spacing of 6 feet.

Table 4. Soil/Material Units and Engineering Parameters for Global Slope Stability Analyses

Soil/Material Unit	Unit Weight (pcf)	Strength Parameters	
		Friction Angle (deg)	Cohesion (psf)
Embankment Fill	110	31	25
Recent Alluvium	120	34	0
Vashon Recessional Outwash	120	34	0
MSE Wall	130	42	1000
Structural Fill	125	38	0
Recompacted Embankment Fill	115	34	25
Soldier Pile	N/A		

Notes: pcf = pounds per cubic foot; psf = pounds per square foot; and deg = degrees.

A minimum factor of safety against global slope failure of 1.5 is considered acceptable under static loading conditions.

The analyses indicate that:

- The existing embankment side slopes, in their current configuration, are marginally stable with a factor of safety of about 1.1.
- Soldier piles walls will provide for a minimum factor of safety of 1.5 against global slope failure.
- MSE walls will provide for a minimum factor of safety of 1.5 against global slope failure where approach fill retained heights are 4 feet or less. For retained heights greater than 4 feet, it would be necessary to deepen MSE walls well below the currently proposed base-of-wall elevations in order to provide sufficient separation from the existing steep embankment side slope faces; this would require a complete roadway closure.

The embankment slope stability models and detailed results are included in Appendix C.

5 Geotechnical Engineering Conclusions and Recommendations

5.1 General

The proposed culvert replacement and roadway modifications can be completed in a manner that will satisfy County standards and WDFW requirements for fish passage.

The proposed stream reconfiguration, roadway widening, and raising of roadway grade, combined with the requirement to maintain one lane of traffic open during construction, will be challenging at the Site. Reducing the length of the bridge structure will result in increased approach fill wall heights, and vice versa. Widening and raising the roadway grade will increase structure cost and complexity.

Aspect collaborated with Herrera Environmental Consultants and Tran Tech Engineering to optimize the structure size and locations. The final proposed creek and roadway/bridge concept and grading plans include the following:

- A 110-foot-long single-span bridge with abutments at a 30-degree skew to the regraded creek channel.
- 1.5H:1V (horizontal:vertical) or shallower regraded creek channel slopes leading down to the regraded stream from the abutments. The bridge will also be at a skew to the re-graded channel slopes. These end slopes will be covered with angular rock to provide for erosion protection and abutment stability.
- 1.5H:1V or shallower regraded embankment/creek channel slopes leading down to the regraded stream from the north approach embankment.
- Cantilevered soldier pile walls and MSE walls to retain proposed new sliver fills along the approaches to the new structure.

Plans and details provided to us by Tran Tech and Herrera show unbalanced retained heights at the proposed abutments varying from 1 to 9 feet. In collaboration with the design team, and in consideration of the necessity of staged construction, we have concluded that cast-in-place concrete abutments supported on concrete-filled, closed-end steel pipe piles, are preferred.

The following sections present general geotechnical engineering design and construction recommendations for the pile-supported abutments, structural approach fill, cantilevered soldier pile walls, and MSE walls.

5.2 Bridge Abutment Design

5.2.1 Abutment Design Narrative

We consider concrete-filled, closed-end steel pipe piles to be a feasible foundation system that also lends itself to staged construction. Based on collaboration with TranTech, we understand the current bridge design concept consists of six 24-inch-diameter, closed-end steel pipe piles at each abutment. The pipe piles will be driven to penetrate the recent alluvium and Vashon recessional outwash and achieve end bearing on the competent, glaciolacustrine unit, which is nominally 80 feet below existing roadway grade. The piles will be filled with reinforced concrete for increased stiffness. This pile type is referred to by WSDOT as "cast-in-place concrete piling."

5.2.2 Minimum Tip Elevation

We recommend the pile tips extend a minimum of 5 feet into the glaciolacustrine unit, or minimum shaft tip Elevation 41 (NAVD88). This will ensure that the pile tips are bearing on dense/hard glacially consolidated soil with high end-bearing capacity.

5.2.3 Driven Pile Axial Resistance

A single 24-inch-diameter, closed-end steel pipe pile driven to the specified minimum tip elevation can achieve an ultimate (nominal) axial compressive capacity of 800 kips or greater. Piles should be laid out with center-to-center spacings of 2.5 pile diameters (2.5D) or greater.

5.2.3.1 LRFD Resistance Factors

A resistance factor of 0.45 should be used to calculate the Strength Limit State Bearing Resistance.

Provided that the piles extend down to minimum tip Elevation 41, and that they are constructed properly, pile settlements will be less than 1 inch under normal service conditions. Therefore, **the Strength Limit State,** not the Service Limit State, should be considered to govern the design.

5.2.3.2 Liquefaction-Induced Downdrag

Our analyses indicate liquefaction could occur within the recent alluvium and Vashon recessional outwash below groundwater. Liquefaction will cause temporary loss or reduction of skin friction within the liquefied layers, and post-liquefaction settlement will induce downdrag loads on the piles from the settling non-liquefiable crust.

We used guidance provided in the 2017 AASHTO LRFD BDS to calculate negative skin friction (i.e., downdrag load) that will develop on a single 24-inch-diameter steel pipe pile. The calculation considers the residual strength properties of fully liquefied soil, and static, non-liquefied soil properties of the non-liquefied crust. For the design profile detailed in Section 3.1.2, we calculate an ultimate downdrag load (DD) of 350 kips for a single 24-inch-diameter steel pipe pile.

Following AASHTO and WSDOT guidance and practices for non-essential bridges, fully liquefied soil conditions and associated downdrag loading should be de-coupled from inertial seismic shaking.

5.2.4 Driven Pile Lateral Resistance

Article 4.7.4.2 of the 2017 AASHTO LRFD BDS states that seismic analysis of single span bridges is not required. However, we understand that Tran Tech may perform lateral load analyses of the driven piles under certain scenarios. As requested, we are providing soil parameters for use in evaluation of lateral load resistance in Table 5.

Table 5. Recommended LPile Parameters

STATIC PARAMETERS							
Soil Unit	**Elevation Range (ft)**	**LPile Soil Model**	**Effective Unit Weight (pcf)**	**Friction Angle (deg)**	**Cohesion (psf)**	**p-y Modulus, k (pci)**	**Strain Factor, ε50**
Existing Embankment Fill and 1.5H:1V abutment end slope	Above 111	Sand (Reese)	110	31	-	25	-
Recent Alluvium (above groundwater)	111 - 107	Sand (Reese)	120	35	-	90	-
Recent Alluvium and Vashon Recessional Outwash (below groundwater)	107 - 46	Sand (Reese)	57.6	35	-	60	-
Glaciolacustrine Deposits	Below 46	Sand (Reese)	67.6	44	-	225	-
FULLY LIQUEFIED PARAMETERS							
Soil Unit	**Elevation Range (ft)**	**LPile Soil Model**	**Effective Unit Weight (pcf)**	**Friction Angle (deg)**	**Cohesion (psf)**	**p-y Modulus, k (pci)**	**Strain Factor, ε50**
Existing Embankment Fill and 1.5H:1V abutment end slope	Above 111	Sand (Reese)	110	31	-	25	-
Recent Alluvium (above groundwater)	111 - 107	Sand (Reese)	120	35	-	90	-
Recent Alluvium and Vashon Recessional Outwash (below groundwater, non-liquefied)	107 - 91 71 - 46	Sand (Reese)	57.6	35	-	60	-
Recent Alluvium and Vashon Recessional Outwash (below groundwater, liquefied	91 - 71	Soft Clay (Matlock)	57.6	-	500	-	0.02
Glaciolacustrine Deposits	Below 46	Sand (Reese)	67.6	44	-	225	-

Notes: pcf = pounds per cubic foot; psf = pounds per square foot; pci = pounds per cubic inch; and deg = degrees.

In accordance with AASHTO and WSDOT guidance and practices, seismic inertial shaking forces, which will develop during the onset of the design earthquake, should be analyzed using static, non-liquefied soil parameters. Fully liquefied soil parameters should be considered after the earthquake shaking has stopped. This practice, referred to as a "de-coupled analysis," is appropriate based on the structure type (single-span, non-essential structure), and the de-aggregation of seismic hazard contributions for the Site.

5.2.5 Lateral Earth Pressures

We developed this list of design conditions/recommendations for lateral earth pressures for use in the design of the abutments:

- The abutments will retain new and existing roadway embankment approach fill.
- The bridge will be designed for abutment displacement, and therefore the abutments can be designed for the active earth pressures presented in Table 6 below.
- The abutments will not be designed for lateral seismic inertial loads in accordance with guidance from the 2017 AASHTO LRFD BDS.
- To account for roadway traffic live load, a uniformly distributed load of 100 pounds per square foot (psf) should be applied to the exposed heights of abutments.
- The proposed 1.6 to 1.9:1V regraded embankment/channel side slopes on the streamside of the abutments will be adequately protected from scour and erosion such that passive resistance within those soils can be relied upon permanently.
- The top 2 feet of passive resistance is neglected for design.
- The granular composition of the retained soils, combined with static groundwater being below the abutments, will prevent the buildup of unbalanced hydrostatic pressures behind the abutments.

Table 6. Lateral Earth Pressures Acting on Abutments and Cantilevered Soldier Pile Walls

Soil Unit	Elevation Range	Backslope/ Foreslope Condition	Active Equivalent Fluid Density[2] (pcf)[1]	Allowable[3] Passive Equivalent Fluid Density[4] (pcf)
Proposed New Embankment Fill Associated with this Project	Above existing grades	Level/NA	32	-
Existing Embankment Fill/Re-Graded Embankment/Channel Slope[5]	Above 111	Level/1.5 to 2.5H:1V (varies)	35	62 (1.5H:1V) 118 (2H:1V) 153 (2.5H:1V)
Recent Alluvium and Vashon Recessional Outwash (Above groundwater)[6]	111 - 107	Level	34	280
Recent Alluvium and Vashon Recessional Outwash (Below groundwater)	107 - 46	Level	16	136

Notes:
1. pcf = pounds per cubic foot
2. The equivalent fluid densities provided above are distributed triangularly along the back of the piles.
3. Allowable passive values account for the sloping ground surface below the walls and include a factor of safety of 1.5.
4. The top 2 feet of passive resistance should be neglected for design.

5. For design purposes, bottom of the existing embankment fill may be assumed to be Elevation 111 (NAVD88).
6. For design purposes, groundwater elevation may be assumed to be Elevation 107 (NAVD88).

5.3 Structural Approach Slab

In preliminary discussions with the design team and Snohomish County Public Works, the topic of an articulated structural approach slab was discussed. It is understood that WSDOT is implementing policy that all bridges along state highways must have approach slabs. Some local agencies may follow the WSDOT example.

The primary purpose of an articulated approach slab is to reduce the consequences of long-term differential settlement between a rigid pile-supported bridge structure and the adjacent grade-supported approach fill. The articulated approach slab acts as a "ramp" and spreads out the differential settlement over the slab's length, minimizing the "bump in the road" that could develop from differential settlement.

In our borings at the Site, we encountered granular soils within and below the roadway embankment. We did not encounter fine-grained soils that are prone to long-term settlement. We conclude that any settlement will be elastic in nature and will occur rapidly as roadway approach fill is placed. With this, along with proper subgrade preparation at the approaches (see Section 5.7) and quality control during fill placement, it is our opinion that articulated approach slabs are not necessary for this Project from geotechnical engineering and roadway serviceability standpoints.

5.4 Cantilevered Soldier Pile Walls

5.4.1 General Design Assumptions and Recommendations

Based on our understanding of the Site soil and groundwater conditions and our experience with soldier pile wall design, we developed a list of assumptions and recommendations to be used in the design of soldier pile walls that will be constructed to accommodate the widening of the road:

- The walls will primarily retain embankment sliver fill and the existing loose embankment fill.
- The soldier piles will be cantilevered and will be able to yield and invoke "active" earth pressure conditions and can be designed using the earth pressures presented in Table 6. Earth pressures for the design of cantilevered soldier piles are also presented in Figure 3.
- The soldier piles will be structurally independent of the bridge foundations/abutments.
- The combined stream, roadway, and bridge plans will be developed to limit the maximum retained heights of the soldier pile walls to about 15 feet. The walls will have average retained heights of 10 feet or less. In accordance with state and local practice, the soldier piles will not be designed for incremental seismic loading (WSDOT, 2015).

- To account for loading from light traffic, a uniformly distributed load of 75 psf should be applied to the exposed height of the walls.
- The ground surface behind the walls will be level; and the ground surface in front of the walls will be sloped down and away from the walls at no steeper than the current conditions (about 1.4H:1V).
- Active pressures will act over the soldier pile center-to-center pile spacing (S) for the exposed height of the wall and over one concreted pile diameter (1B) for the depth of the piles embedded below the base of the wall.
- The top two feet of passive resistance is neglected for design. Passive earth pressures will act over two and a half concreted pile diameters (2.5B) for the depth of the piles embedded in the existing loose embankment fill and over three concreted pile diameters (3B) for the depth of the piles embedded in the recent alluvium and Vashon recessional outwash, but not more than the soldier pile center-to-center spacing (S). For design purposes, the bottom of the existing embankment fill may be assumed to be Elevation 111 (NAVD88). Soldier pile embedment requirements will be determined by the structural engineer but should not be less than twice the exposed height.
- The walls will be free draining through gaps in the lagging and buildup of unbalanced hydrostatic pressures behind the walls will not occur.
- We advocate treated timber lagging be used for these walls for ease of construction and cost consideration compared to concrete lagging. The timber lagging can be designed using 100 percent of the lateral earth pressures shown in Table 7 and should have a minimum thickness of 4 inches.

5.5 Mechanically Stabilized Earth (MSE) Walls

Our stability analyses indicate MSE walls can be used to retain sliver fills on the crest of the embankment, provided the two following conditions are both met:

1. Re-graded embankment/creek channel slopes are 2H:1V or shallower (measured perpendicular to the face of the wall)
2. Retained heights are 4 feet or less

An MSE wall is a composite gravity system consisting of layers of soil reinforcement and compacted high shear strength backfill. The soil reinforcement typically consists of steel strips or geosynthetic attached to a facing. The system relies on the tensile strength of the reinforcement and the friction between the backfill soil and reinforcement for stability. We provide the following recommendations for the design and construction of MSE walls for the Project.

- The walls should be designed using the parameters provided in Table 7. The values assume the reinforced soils consist of imported, free-draining sand and gravel materials meeting the requirements for Gravel Backfill for Walls (WSDOT Standard Specification 9-03.12(2) (WSDOT, 2018b).

Table 7. Parameters for the Design of MSE Walls

Soil Parameter	Reinforced Soil	Retained Soil	Foundation Soil
Unit Weight (pcf)	130	110	110
Friction Angle (degrees)	38	31	34
Cohesion (degrees)	0	25	25

- The walls should bear on the existing embankment fill subgrade soils that have been compacted in-place to at least 95 percent of the material maximum dry density per ASTM D1557 (ASTM International, 2018). The width of recompacted subgrade should extend from the toe of the MSE wall to the back of the reinforced zone.
- The walls should bear at least 12 inches below finished grade in front of the walls. The toe of the wall should be setback at least 3 feet (measured laterally) from the face of the embankment slope.
- Permanent erosion control should be provided along the toe of the walls.
- The walls should be designed with a factor of safety of at least 1.5 for sliding, overturning, and reinforcement pullout failure modes.

5.6 Earthwork

We anticipate Site earthwork can be completed with standard construction equipment such as tracked excavators, dozers, and mobile cranes.

Appropriate erosion and sedimentation control measures should be in accordance with the local best management practices (BMPs) and should be installed prior to beginning earthwork activities.

5.6.1 Temporary Excavation Slopes

Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. All temporary cuts in excess of 4 feet in height that are not protected by trench boxes or otherwise shored, should be sloped in accordance with Part N of Washington Administrative Code (WAC) 296-155 for worker safety (WAC, 2016). For planning purposes and using guidance provided by the WAC and our Site observations, we classify the Site soils as Type C with a maximum allowable temporary slope inclination of 1.5H:1V.

With time and the presence of seepage and/or precipitation, the stability of temporary unsupported cut slopes can be significantly reduced. Therefore, the contractor should protect all temporary slopes from erosion.

In addition, the contractor should monitor the stability of the temporary cut slopes and adjust the construction schedule and slope inclination accordingly. Vibrations created by traffic and construction equipment may cause caving and raveling of the temporary

slopes. In such an event, lateral support for the temporary slopes should be provided by the contractor.

5.7 Embankment and Pavement Design

New fill for approach embankments should consist of compacted structural fill materials detailed below in Section 5.8. Based on the currently proposed bridge/roadway concept, up to about 5 feet of new embankment fill will be required to raise grades; the thickness of the new fill will be greatest at the abutment locations and will reduce in thickness away from the abutments. We expect embankment soil settlement will occur as structural fill is being placed with no appreciable long-term settlement expected.

Prior to the placement of new fill for approaches, existing approach subgrade should be evaluated by a geotechnical inspector. Zones of appreciably soft soils or high organics identified during evaluation should be removed (or subexcavated) until suitable subgrade soils are exposed. Once all unsuitable material has been removed to the satisfaction of the geotechnical inspector, the subexcavations can be backfilled with imported structural fill (see Section 5.8). The final subgrade surface should be compacted using heavy construction equipment to a firm and unyielding condition prior to the placement of new fill.

The new roadway pavement section should meet applicable County standards and should be no less than 4 inches of hot mix asphalt (HMA) over at least 8 inches of crushed surfacing. The upper 2 inches of crushed surfacing may be top course (CSTC) and the lower 6 inches may be base course (CSBC).

5.8 Structural Fill

5.8.1 Behind Abutments, Soldier Pile Walls, and MSE Walls

Structural fill placed directly behind abutments and soldier pile walls and within the reinforced zone of MSE walls should consist of freely draining sand and gravel meeting the gradation requirements for Gravel Backfill for Walls, WSDOT Standard Specification 9-03.12(2).

5.8.2 Approach Embankments and Use of On-Site Soils

We provide the following recommendations for structural fill used to construct approach embankments:

- Structural fill for approach embankments, if on-Site materials are used, should generally meet the requirements for Common Borrow, WSDOT Standard Specification 9-03.14(3). If imported materials are used, they should meet the requirements for Gravel Borrow, WSDOT Standard Specification 9-03.14(1) (WSDOT 2018b).
- The majority of on-Site fill (GP-GM and SM) and recent alluvium (SP-SM and GW-GM) materials generally meet the Common Borrow criteria and are suitable use as structural fill for approach embankments, with some exceptions. If present,

organics or other deleterious materials should be removed from the on-Site material before being used as structural fill.

- We recommend limiting the maximum particle size of the on-Site materials to 12 inches for use as structural fill for approach embankments.
- The uppermost 24 inches of the approach embankment fill (including the CSTC and CSTB thicknesses of the pavement section) should consist of imported crushed rock, gravel, or other free-draining material that does not exceed 3 inches in diameter.
- Placement and compaction of structural fill for approach embankments during the dry summer months is preferred because the structural fill materials may contain enough fines (silt and clay) to be moisture-sensitive in wet weather, especially the on-Site materials.

5.8.3 Compaction Criteria

Soils placed beneath or around the bridge abutments, soldier pile walls, MSE walls, the roadway embankment, and below paved areas should be considered as structural fill and placed and compacted in general accordance with the methods described in Method C, WSDOT Standard Specification 2-03.3(14) C (WSDOT 2018b).

6 References

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7 Limitations

Work for this project was performed for Herrera Environmental Consultants (Client), and this report was prepared consistent with recognized standards of professionals in the same locality and involving similar conditions, at the time the work was performed. No other warranty, expressed or implied, is made by Aspect Consulting, LLC (Aspect).

Recommendations presented herein are based on our interpretation of site conditions, geotechnical engineering calculations, and judgment in accordance with our mutually agreed-upon scope of work. Our recommendations are unique and specific to the project, site, and Client. Application of this report for any purpose other than the project should be done only after consultation with Aspect.

Variations may exist between the soil and groundwater conditions reported and those actually underlying the site. The nature and extent of such soil variations may change over time and may not be evident before construction begins. If any soil conditions are encountered at the site that are different from those described in this report, Aspect should be notified immediately to review the applicability of our recommendations.

Risks are inherent with any site involving slopes and no recommendations, geologic analysis, or engineering design can assure slope stability. Our observations, findings, and opinions are a means to identify and reduce the inherent risks to the Client.

It is the Client's responsibility to see that all parties to this project, including the designer, contractor, subcontractors, and agents, are made aware of this report in its entirety. At the time of this report, design plans and construction methods have not been finalized, and the recommendations presented herein are based on preliminary project information. If project developments result in changes from the preliminary project information, Aspect should be contacted to determine if our recommendations contained in this report should be revised and/or expanded upon.

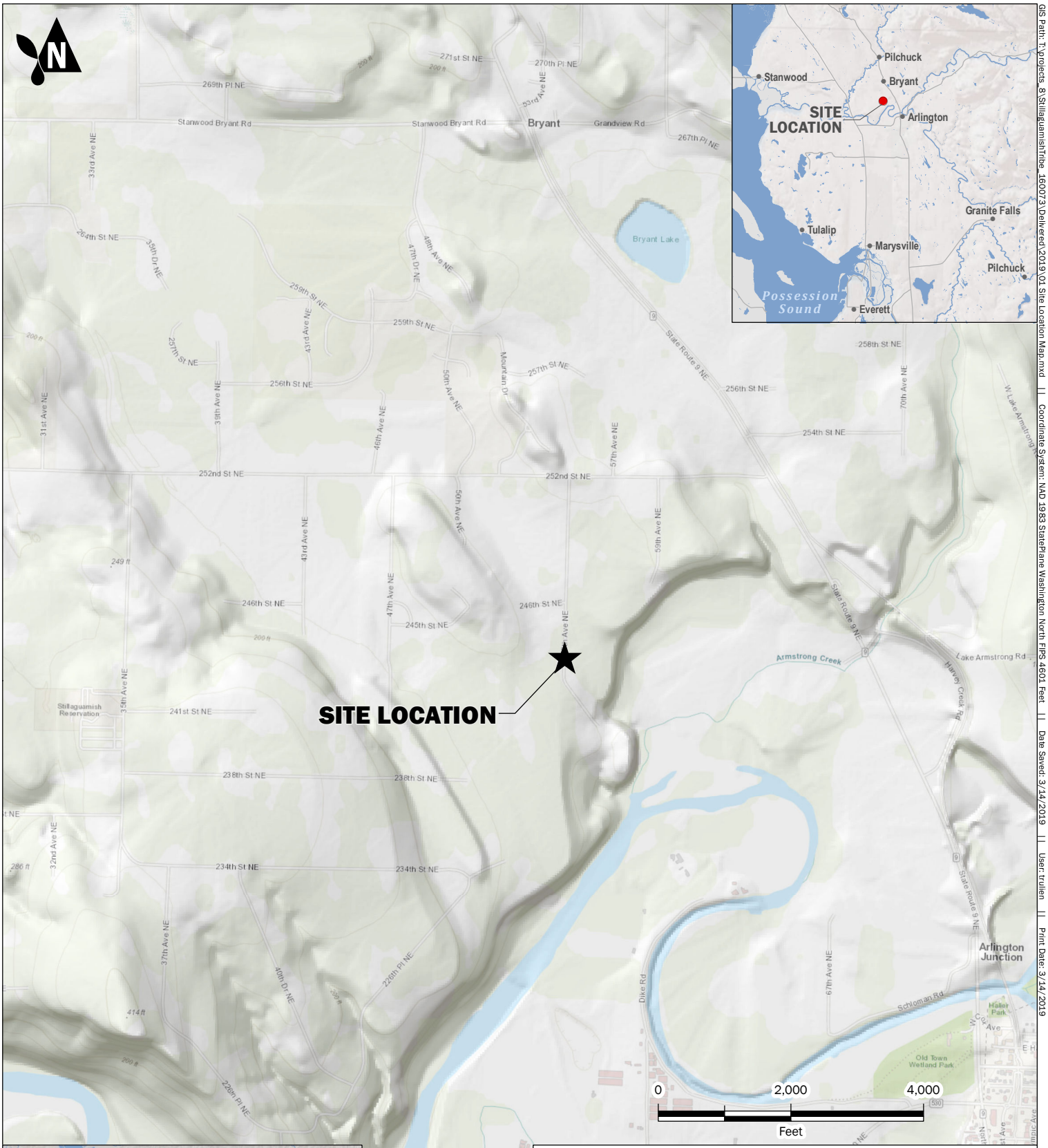
The scope of work does not include services related to construction safety precautions. Site safety is typically the responsibility of the contractor, and our recommendations are not intended to direct the contractor’s site safety methods, techniques, sequences, or procedures. The scope of our work also does not include the assessment of environmental characteristics, particularly those involving potentially hazardous substances in soil or groundwater.

All reports prepared by Aspect for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect. Aspect’s original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

Please refer to Appendix D titled “Report Limitations and Guidelines for Use” for additional information governing the use of this report.

We appreciate the opportunity to perform these services. If you have any questions please call Erik Andersen, PE, Principal Geotechnical Engineer, at 425.772.4705.

FIGURES



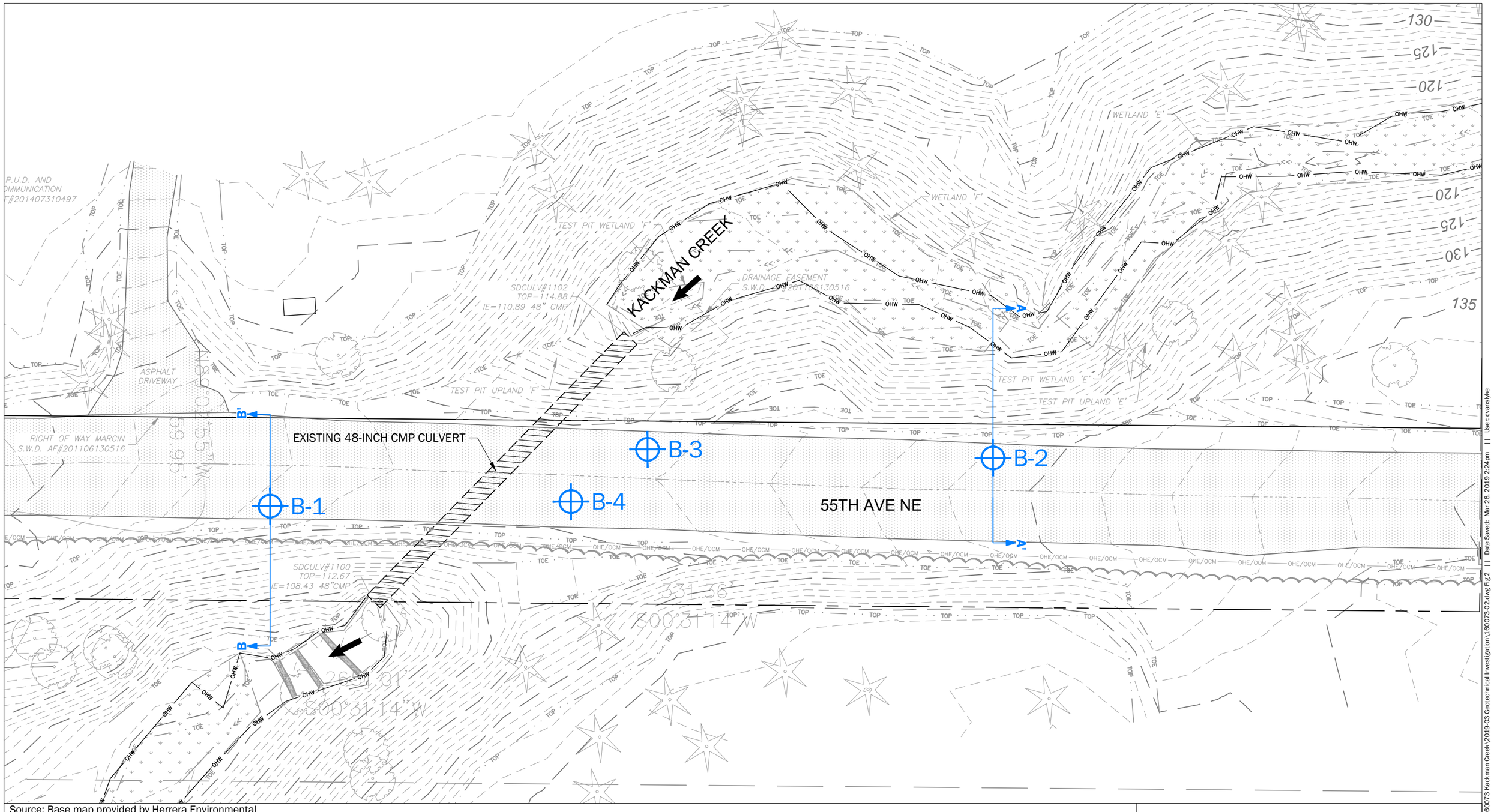
Site Location Map

Kackman Creek 55th Ave NE Culvert Replacement
and Roadway Widening
Arlington, Washington

Aspect CONSULTING	MAR-2019	BY: EOA / KES	FIGURE NO. 1
	PROJECT NO. 160073	REVISED BY: TDR	

Basemap Layer Credits | | Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community
Copyright:© 2014 Esri

GIS Path: T:\projects_8\Stillaguamish Tribe_160073\Delivered\2019\03 Site Location Map.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 3/14/2019 || User: trullen || Print Date: 3/14/2019



Source: Base map provided by Herrera Environmental Consultants, Inc., March, 2019.

Legend

- Boring Location
- A A' Cross-Section Location

0 20 40 Feet

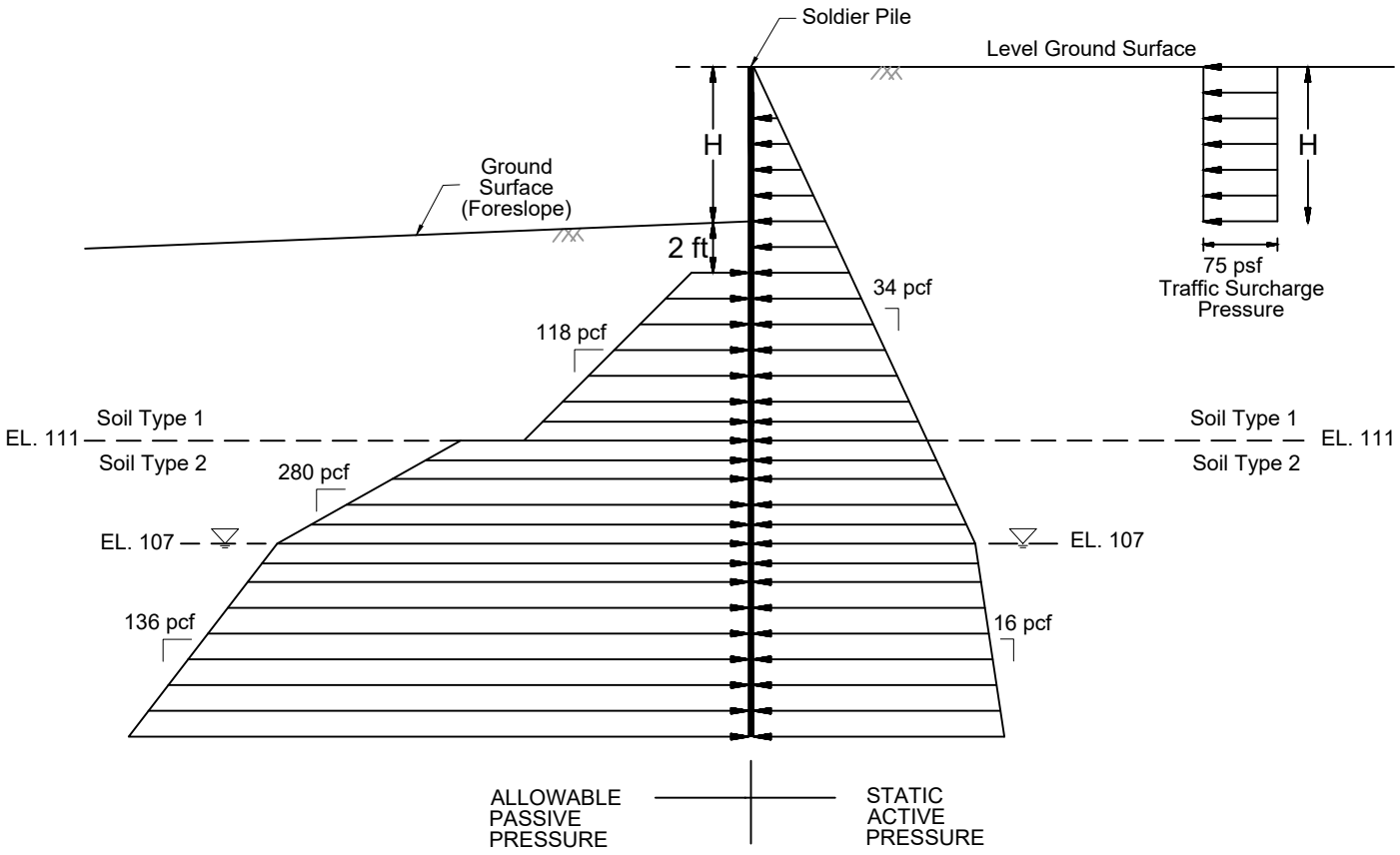
Exploration Location Map

Kackman Creek 55th Ave NE
Culvert Replacement and Roadway Widening
Arlington, Washington

Aspect Consulting	Mar-2019	BY: ECS/CMV	FIGURE NO. 2
	PROJECT NO. 160073	REVISED BY: -	

CAD Path: \\SEASTORE2\Drafting_GeoTech\160073 Kackman Creek\2019-03 Geotechnical Investigation\160073-02.dwg Fig 2 | | Date Saved: Mar 28, 2019 2:24pm | | User: cvanslyke

EARTH PRESSURES FOR CANTILEVER SOLDIER PILE WALL DESIGN



NOT TO SCALE

Soil Type	Active Pressure Width Above Base of Wall	Active Pressure Width Below Base of Wall	Passive Pressure Width Below Base of Wall
1	S	1B	2.5B
2			3B

Where:

B = Soldier Pile Concreted Diameter

S = Soldier Pile Spacing

NOTES

1. LATERAL EARTH PRESSURES ARE SHOWN AS EQUIVALENT FLUID DENSITIES IN POUNDS PER CUBIC FOOT (PCF), LINEAR DIMENSIONS IN FEET (FT). SURCHARGE PRESSURES ARE SHOWN IN POUNDS PER SQUARE FOOT (PSF).
2. LATERAL EARTH PRESSURES SHOWN ARE APPROPRIATE FOR PERMANENT CANTILEVER SOLDIER PILE WALLS.
3. LATERAL EARTH PRESSURES SHOWN ASSUME THE WALL IS ALLOWED TO YIELD AND ACTIVE EARTH PRESSURES APPLY BEHIND THE WALL.
4. PASSIVE EARTH PRESSURES SHOULD BE NEGLECTED WITHIN 2 FT OF THE FINAL GROUND SURFACE, AS SHOWN ABOVE.
5. PASSIVE EARTH PRESSURES SHOWN ASSUME A 2H:1V OR SHALLOWER FORESLOPE WITHIN SOIL TYPE 1 AND A LEVEL FORESLOPE WITHIN SOIL TYPE 2 AND INCLUDE A FACTOR OF SAFETY OF 1.5.

Legend

H = Retained Height of Wall (Feet)

Cantilever Soldier Pile Wall Earth Pressure Diagram

Kackman Creek 55th Ave Culvert Replacement and Roadway Widening

Snohomish County, WA

Aspect Consulting	JAN-2020	BY: MO/ECS	FIGURE NO. 3
	PROJECT NO. 160073	REVISED BY:	

CAD Path: C:\Users\motto\appdata\local\temp\AcPublish_18572\Figure 3_Kackman.dwg 03 - SP Wall || Date Saved: Feb 03, 2020 10:36am || User: motto

APPENDIX A

Subsurface Explorations

A.1 Field Exploration Program

A.1.1 Geotechnical Borings

Aspect Consulting, LLC (Aspect) completed four machine-drilled borings (designated B-1 through B-4) at the Site. Borings B-1 through B-3 were completed on October 6, 2016, and boring B-4 was completed on September 25, 2017. The machine-drilled borings were advanced with hollow-stem auger drilling methods using a CME-85 track-mounted drill rig operated by Gregory Drilling under subcontract to Aspect.

In the machine-drilled borings, disturbed soil samples were obtained at 2.5- to 5-foot intervals using the Standard Penetration Test (SPT) in accordance with ASTM International (ASTM) D1586, *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils* (ASTM, 2018). The Standard Penetration Test involves driving a 2-inch-outside-diameter split-barrel sampler a distance of 18 inches into the soil with a 140-pound hammer free-falling a distance of 30 inches (the drill rig employed on this Project used an automatic trip hammer to raise and lower the hammer). The number of blows for each 6-inch interval is recorded and the number of blows required to drive the sampler for the last two intervals (a total of 12 inches) is known as the Standard Penetration Resistance ("N-value") or blow count. The N-value provides a measure of relative density of granular soils or the relative consistency of cohesive soils.

An Aspect staff engineer was present throughout the exploration program to observe the drilling procedures, assist in sampling, and to prepare descriptive logs of the explorations. Soils were identified in general accordance with ASTM D2488, *Standard Practice for Description and Identification of Soils* (*Visual-Manual Procedure)* (ASTM, 2018). The summary exploration logs represent our interpretation of the contents of the field logs. The stratigraphic contacts shown on the individual summary logs represent the approximate boundaries between soil types; actual transitions may be more gradual. The subsurface conditions depicted are only for the specific date and locations reported, and therefore, are not necessarily representative of other locations and times.

Upon completion, the machine-drilled borings were backfilled with 3/8-inch bentonite chips in accordance with requirements of the Washington State Department of Ecology.

Coarse-Grained Soils - More than 50% (1) Retained on No. 200 Sieve	Gravels - More than 50% (1) of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines (5)	GW	Well-graded gravel and gravel with sand, little to no fines
			GP	Poorly-graded gravel and gravel with sand, little to no fines
		≥15% Fines (5)	GM	Silty gravel and silty gravel with sand
			GC	Clayey gravel and clayey gravel with sand
	Sands - 50% (1) or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines (5)	SW	Well-graded sand and sand with gravel, little to no fines
			SP	Poorly-graded sand and sand with gravel, little to no fines
		≥15% Fines (5)	SM	Silty sand and silty sand with gravel
			SC	Clayey sand and clayey sand with gravel
Fine-Grained Soils - 50% (1) or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less than 50		ML	Silt, sandy silt, gravelly silt, silt with sand or gravel
			CL	Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay
			OL	Organic clay or silt of low plasticity
	Silts and Clays Liquid Limit 50 or More		MH	Elastic silt, clayey silt, silt with micaceous or diato-maceous fine sand or silt
			CH	Clay of high plasticity, sandy or gravelly clay, fat clay with sand or gravel
			OH	Organic clay or silt of medium to high plasticity
Highly Organic Soils			PT	Peat, muck and other highly organic soils

Terms Describing Relative Density and Consistency

	Density	SPT (2) blows/foot
Coarse-Grained Soils	Very Loose	0 to 4
	Loose	4 to 10
	Medium Dense	10 to 30
	Dense	30 to 50
	Very Dense	>50
	Consistency	**SPT (2) blows/foot**
Fine-Grained Soils	Very Soft	0 to 2
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
	Very Stiff	15 to 30
	Hard	>30

Test Symbols

FC = Fines Content
G = Grain Size
M = Moisture Content
A = Atterberg Limits
C = Consolidation
DD = Dry Density
K = Permeability
Str = Shear Strength
Env = Environmental
PiD = Photoionization Detector

Component Definitions

Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

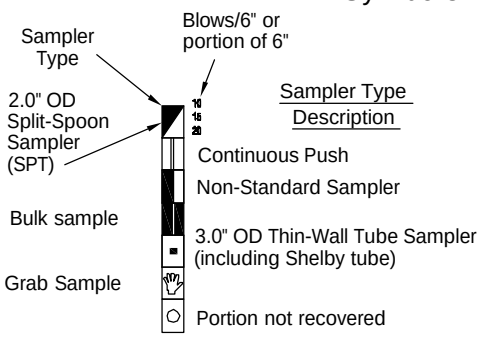
(3) Estimated Percentage

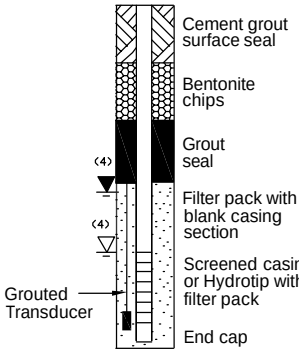
Percentage by Weight	Modifier
<5	Trace
5 to 15	Slightly (sandy, silty, clayey, gravelly)
15 to 30	Sandy, silty, clayey, gravelly)
30 to 49	Very (sandy, silty, clayey, gravelly)

Moisture Content

Dry - Absence of moisture, dusty, dry to the touch
Slightly Moist - Perceptible moisture
Moist - Damp but no visible water
Very Moist - Water visible but not free draining
Wet - Visible free water, usually from below water table

Symbols





(1) Percentage by dry weight
(2) (SPT) Standard Penetration Test (ASTM D-1586)
(3) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)
(4) Depth of groundwater — ATD = At time of drilling; Static water level (date); BGS = below ground surface
(5) Combined USCS symbols used for fines between 5% and 15% as estimated in General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

Aspect CONSULTING

Exploration Log Key

DATE:
DESIGNED BY:
DRAWN BY:
REVISED BY:

PROJECT NO.

FIGURE NO.
A-1

Q:_ACAD Standards\Standard Details\Exploration Log Key A1.dwg

Aspect CONSULTING	Kackman Creek 55th Ave Culvert Replacement - 160073		Geotechnical Exploration Log	
	Project Address & Site Specific Location 55th Ave at Kackman Creek - Arlington, WA, See Figure 2		*Coordinates* NA	*Exploration Number* **B-1**
Contractor Gregory Drilling	*Equipment* CME-55 track-mounted drill rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface (GS) Elev. (NAVD88)* 127'	
Operator	*Exploration Method(s)* 4.25-in ID Hollow Stem Auger	*Work Start/Completion Dates* 10/6/2016	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 20' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
								Asphalt (8 inches thick)	
								FILL Loose, slightly moist, brown, slightly sandy, slightly silty GRAVEL (GP-GM); fine to coarse sand; coarse, subrounded to rounded gravel and cobbles.	
5	125		S-1	▲	1 2 3				
			S-2	▲●	3 3 2	GS		Loose, slightly moist, brown, slightly gravelly to gravelly, silty SAND (SM); fine to coarse sand; fine to coarse, subrounded to rounded gravel.	5
10	120		S-3	▲	2 2 2			Becomes very loose	
			S-4	▲	2 1 2				10
15	115		S-5	▲	2 3 5			Becomes loose	
			S-6	▲	4 9 10				15
	110		S-7	● ▲	9 12 13	GS		**RECENT ALLUVIUM** Medium dense, moist, gray-brown, very sandy, slightly silty GRAVEL (GW-GM); medium to coarse sand; fine to coarse, subrounded to rounded gravel.	
20		▽ 10/6/2016	S-8	▲	4 9 11			Becomes wet	20
	105								
25			S-9	▲	8 10 18			**VASHON RECESSIONAL OUTWASH** Medium dense, wet, gray, slightly gravelly SAND (SP); trace silt; medium to coarse sand; fine to coarse, subrounded to rounded gravel.	25
	100								

Borehole backfilled with bentonite chips and capped with concrete at surface.

Legend

Sample Method
- ◯ No Soil Sample Recovery
- ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: ECS
Approved by: EOA

Exploration Log B-1

Sheet 1 of 2

OLD STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\ENSELMAN ROAD CULVERT REPLACEMENT-160073.GPJ March 13, 2019

Aspect CONSULTING	Kackman Creek 55th Ave Culvert Replacement - 160073		Geotechnical Exploration Log	
	Project Address & Site Specific Location 55th Ave at Kackman Creek - Arlington, WA, See Figure 2		*Coordinates* NA	*Exploration Number* **B-1**
Contractor Gregory Drilling	*Equipment* CME-55 track-mounted drill rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface (GS) Elev. (NAVD88)* 127'	
Operator	*Exploration Method(s)* 4.25-in ID Hollow Stem Auger	*Work Start/Completion Dates* 10/6/2016	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 20' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
			S-10		2 13 14			**VASHON RECESSIONAL OUTWASH** Medium dense, wet, gray, slightly gravelly SAND (SP); trace silt; medium to coarse sand; fine to coarse, subrounded to rounded gravel. (continued)	
35	95		S-11		3 5 11				35
40	90		S-12		6 10 12				40
45	85		S-13		5 9 18				45
50	80							Bottom of exploration at 46.5 ft. bgs.	50
55	75								55
	70								

Legend

Sample Method
- ◯ No Soil Sample Recovery
- ◩ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢—⊣ Liquid Limit

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: ECS
Approved by: EOA

Exploration Log B-1
Sheet 2 of 2

OLD STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\ENSELMAN ROAD CULVERT REPLACEMENT-160073.GPJ March 13, 2019

Aspect CONSULTING	Kackman Creek 55th Ave Culvert Replacement - 160073		Geotechnical Exploration Log	
	Project Address & Site Specific Location 55th Ave at Kackman Creek - Arlington, WA, See Figure 2		*Coordinates* NA	*Exploration Number* **B-2**
Contractor Gregory Drilling	*Equipment* CME-55 track-mounted drill rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface (GS) Elev. (NAVD88)* 129'	
Operator	*Exploration Method(s)* 4.25-in ID Hollow Stem Auger	*Work Start/Completion Dates* 10/6/2016	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 18' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
								Asphalt (6 inches thick)	
								FILL Loose, slightly moist, brown, silty SAND (SM); fine to medium sand; trace fine to coarse, subrounded to rounded gravel.	
	125	Borehole backfilled with bentonite chips and capped with concrete at surface.	S-1	▲	5 3 2				
5			S-2	▲ ●	3 1 1	GS		Becomes very loose	5
			S-3	▲	1 0 0				
	120								
10			S-4	▲	3 1 2				10
			S-5	▲	1 1 1				
	115								
15			S-6	▲	2 2 3			Becomes loose	15
		▽ 10/6/2016	S-7	▲	17 16 13			**RECENT ALLUVIUM** Medium dense, moist, gray, gravelly, slightly silty SAND (SP-SM); fine to medium sand; fine to coarse, subrounded to rounded gravel.	
	110								
20			S-8	● ▲	9 9 14			**VASHON RECESSIONAL OUTWASH** Medium dense, wet, gray, gravelly, slightly silty SAND (SP-SM); medium to coarse sand; fine to coarse, subrounded to rounded gravel.	20
	105								
25			S-9	▲	23 22 17				25
	100								

Plastic Limit ⊢—⊣ Liquid Limit

Legend

Sample Method
- ◯ No Soil Sample Recovery
- ◪ Split Barrel 2" X 1.375" (SPT)

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: ECS
Approved by: EOA

Exploration Log B-2

Sheet 1 of 2

OLD STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\ENSELMAN ROAD CULVERT REPLACEMENT-160073.GPJ March 13, 2019

Aspect CONSULTING	Kackman Creek 55th Ave Culvert Replacement - 160073		Geotechnical Exploration Log	
	Project Address & Site Specific Location 55th Ave at Kackman Creek - Arlington, WA, See Figure 2		*Coordinates* NA	*Exploration Number* **B-2**
Contractor Gregory Drilling	*Equipment* CME-55 track-mounted drill rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface (GS) Elev. (NAVD88)* 129'	
Operator	*Exploration Method(s)* 4.25-in ID Hollow Stem Auger	*Work Start/Completion Dates* 10/6/2016	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 18' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
			S-10		3 7 12			**VASHON RECESSIONAL OUTWASH** Medium dense, wet, gray, gravelly, slightly silty SAND (SP-SM); medium to coarse sand; fine to coarse, subrounded to rounded gravel. (continued)	
35	95		S-11		9 15 17				35
40	90		S-12		6 9 15				40
								Bottom of exploration at 41.5 ft. bgs.	
45	85								45
50	80								50
55	75								55
	70								

Legend

Sample Method
- ◯ No Soil Sample Recovery
- ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢—⊣ Liquid Limit

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: ECS
Approved by: EOA

Exploration Log B-2
Sheet 2 of 2

OLD STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\ENSELMAN ROAD CULVERT REPLACEMENT-160073.GPJ March 13, 2019

Aspect CONSULTING	Kackman Creek 55th Ave Culvert Replacement - 160073		Geotechnical Exploration Log	
	Project Address & Site Specific Location 55th Ave at Kackman Creek - Arlington, WA, See Figure 2		*Coordinates* NA	*Exploration Number* **B-3**
Contractor Gregory Drilling	*Equipment* CME-55 track-mounted drill rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface (GS) Elev. (NAVD88)* 126'	
Operator	*Exploration Method(s)* 4.25-in ID Hollow Stem Auger	*Work Start/Completion Dates* 10/6/2016	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 20' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
0	125	Borehole backfilled with bentonite chips and capped with concrete at surface.						Asphalt (6 inches thick)	0
								FILL Very loose, slightly moist, brown, slightly silty SAND (SP-SM); fine to medium sand; trace gravel.	
5	120		S-1	▲ ●	2 2 1	GS			5
10	115		S-2	▲	3 2 2				10
15	110		S-3	▲	13 15 21			**RECENT ALLUVIUM** Dense, moist, gray-brown, gravelly, slightly silty SAND (SP-SM); medium to coarse sand; fine to coarse, subrounded to rounded gravel.	15
20	105	▽ 10/6/2016	S-4	●	5 8 10	GS		**VASHON RECESSIONAL OUTWASH** Medium dense, wet, gray, gravelly, SAND (SP); trace silt; medium to coarse sand; fine to coarse, subrounded to rounded gravel.	20
25	100		S-5	▲	8 10 13				25

Legend

Sample Method
- ◯ No Soil Sample Recovery
- ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢—⊣ Liquid Limit

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: ECS
Approved by: EOA

Exploration Log B-3

Sheet 1 of 2

OLD STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\ENSELMAN ROAD CULVERT REPLACEMENT-160073.GPJ March 13, 2019

Aspect CONSULTING	Kackman Creek 55th Ave Culvert Replacement - 160073		Geotechnical Exploration Log	
	Project Address & Site Specific Location 55th Ave at Kackman Creek - Arlington, WA, See Figure 2		*Coordinates* NA	*Exploration Number* **B-3**
Contractor Gregory Drilling	*Equipment* CME-55 track-mounted drill rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface (GS) Elev. (NAVD88)* 126'	
Operator	*Exploration Method(s)* 4.25-in ID Hollow Stem Auger	*Work Start/Completion Dates* 10/6/2016	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 20' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
35	95		S-6		2 8 11			**VASHON RECESSIONAL OUTWASH** Medium dense, wet, gray, gravelly, SAND (SP); trace silt; medium to coarse sand; fine to coarse, subrounded to rounded gravel. (continued)	35
40	90		S-7		2 6 9				40
45	85		S-8		3 6 11				45
50	80								50
55	75	Boring backfilled with bentonite chips and capped with ready-mix concrete at surface.						Bottom of exploration at 55 ft. bgs.	55
	70								

Legend

Sample Method
- ◯ No Soil Sample Recovery
- ◩ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: ECS
Approved by: EOA

Exploration Log B-3
Sheet 2 of 2

OLD STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\ENSELMAN ROAD CULVERT REPLACEMENT-160073.GPJ March 13, 2019

Aspect CONSULTING	Kackman Creek 55th Ave Culvert Replacement - 160073		Geotechnical Exploration Log	
	Project Address & Site Specific Location 55th Ave at Kackman Creek - Arlington, WA, See Figure 2		*Coordinates* NA	*Exploration Number* **B-4**
Contractor Gregory Drilling	*Equipment* CME-85 truck-mounted drill rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface (GS) Elev. (NAVD88)* 126'	
Operator	*Exploration Method(s)* 4.25-in ID Hollow Stem Auger	*Work Start/Completion Dates* 9/25/2017	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 20' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
0	125	Borehole backfilled with bentonite chips and capped with concrete at surface.						Asphalt (5 inches thick)	0
								FILL Loose, moist, brown, silty SAND (SM); fine to medium sand.	
5	120		S-1	▲	3 4 3				5
10	115	No sample recovery	S-2	▲	8 10 10			Blowcounts likely overstated due to oversize gravels.	10
15	110		S-3	▲	10 16 13			**RECENT ALLUVIUM** Medium dense, moist, gray-brown, slightly gravelly to gravelly, slightly silty SAND (SP-SM); fine to coarse sand; fine to coarse, subrounded to rounded gravel.	15
20	105	▽ 9/25/2017	S-4	▲	14 18 14			Becomes very moist to wet	20
25	100	No sample recovery	S-5	▲	20 26 33				25

Legend

Sample Method
- ◯ No Soil Sample Recovery
- ◩ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: ECS
Approved by: EOA

Exploration Log B-4

Sheet 1 of 3

OLD STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\ENSELMAN ROAD CULVERT REPLACEMENT-160073.GPJ March 13, 2019

Aspect CONSULTING	Kackman Creek 55th Ave Culvert Replacement - 160073		Geotechnical Exploration Log	
	Project Address & Site Specific Location 55th Ave at Kackman Creek - Arlington, WA, See Figure 2		*Coordinates* NA	*Exploration Number* **B-4**
Contractor Gregory Drilling	*Equipment* CME-85 truck-mounted drill rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface (GS) Elev. (NAVD88)* 126'	
Operator	*Exploration Method(s)* 4.25-in ID Hollow Stem Auger	*Work Start/Completion Dates* 9/25/2017	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 20' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
			S-6		11 15 12			**VASHON RECESSIONAL OUTWASH** Medium dense, wet, gray SAND (SP); trace silt; mostly fine to medium sand with some coarse sand; few fine to coarse, subrounded to rounded gravel.	
35	95	No sample recovery	S-7		6 19 16			Becomes dense	35
40	90		S-8		8 13 14			Becomes medium dense	40
45	85		S-9		7 12 11				45
50	80		S-10		11 10 12			Becomes thinly interbedded with very silty SAND (SM)	50
55	75		S-11		6 11 15				55
	70								

Legend

Sample Method
- ◯ No Soil Sample Recovery
- ◩ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢—⊣ Liquid Limit

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: ECS
Approved by: EOA

Exploration Log B-4

Sheet 2 of 3

OLD STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\ENSELMAN ROAD CULVERT REPLACEMENT-160073.GPJ March 13, 2019

Aspect CONSULTING	Kackman Creek 55th Ave Culvert Replacement - 160073		Geotechnical Exploration Log	
	Project Address & Site Specific Location 55th Ave at Kackman Creek - Arlington, WA, See Figure 2		*Coordinates* NA	*Exploration Number* **B-4**
Contractor Gregory Drilling	*Equipment* CME-85 truck-mounted drill rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface (GS) Elev. (NAVD88)* 126'	
Operator	*Exploration Method(s)* 4.25-in ID Hollow Stem Auger	*Work Start/Completion Dates* 9/25/2017	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 20' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
			S-12		17 20 20			**VASHON RECESSIONAL OUTWASH** Medium dense, wet, gray SAND (SP); trace silt; mostly fine to medium sand with some coarse sand; few fine to coarse, subrounded to rounded gravel. (continued) Becomes dense	
65	65		S-13		13 12 16			Becomes medium dense	65
70	60		S-14		13 22 24			Becomes dense	70
75	55		S-15		13 19 17				75
80	50		S-16		20 35 39			**GLACIOLACUSTRINE DEPOSITS** Hard, slightly moist, gray, SILT (ML); low plasticity; thinly interbedded with fine to medium, slightly silty SAND (SP-SM). Bottom of exploration at 81.5 ft. bgs.	80
85	45								85
	40								

Legend

Sample Method
- ◯ No Soil Sample Recovery
- ◩ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: ECS
Approved by: EOA

Exploration Log B-4

Sheet 3 of 3

OLD STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\ENSELMAN ROAD CULVERT REPLACEMENT-160073.GPJ March 13, 2019

APPENDIX B

Results of Geotechnical Laboratory Testing

B.1 Geotechnical Laboratory Testing

Laboratory tests were conducted on selected soil samples to characterize certain engineering (physical) properties of the soils at the Site. Laboratory testing included determination of moisture content and grain-size distribution. The laboratory tests were conducted in general accordance with appropriate ASTM International (ASTM) test methods. Test procedures are discussed below.

The moisture content of selected samples was analyzed in general accordance with ASTM D-2216, *Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*. The grain size distribution of selected samples was analyzed in general accordance with ASTM D-422, *Standard Test Method for Particle-Size Analysis of Soils* without hydrometer determination of fines content.

The results of the moisture content tests are presented in Appendix B and graphically on the boring logs in Appendix A. The results of the grain size distribution tests are presented as curves in Appendix B, plotting percent finer by weight versus grain size.

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Client:	Aspect Consulting, LLC	**Date:**	October 31, 2016
Address:	907 Harris Ave.	**Project:**	Enselman Culvert Replacement
	Bellingham, WA. 98225	**Project #:**	16B013-08
Attn:	Matthew Lewis	**Sample #:**	B16-1294-1299
		Date Sampled:	October 26, 2016

As requested, MTC has tested each sample according to the ASTM standards and methods. The following is a case narrative summarizing details during the test(s) performed. Please refer to attached report(s) for actual data. Notes and descriptions in this section are based on visual identification, as received prior to testing.

B-1 S-2 5', dark red/brown silty sand with gravel, moistre content-8.5%: B16-1294

B-1 S-7 17.5', gray brown silty sand with gravel, moisture content- 4.1%: B16-1295

B-2 S-2 5', red brown silty sand with gravel, moisture content-11.2%: B16-1296

B-2 S-8 20', brown silty sand with gravel, moisture content-17.9%: B16-1297

B-3 S-1 5', brown silty sand with minor gravel, moisture content-10.2%: B16-1298

B-3 S-4 20', gray sand with gravel and minor silt, moisture content-15.9%: B16-1299

Soil classification on sieve report.

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Cheryl Meredith
WABO Supervising Laboratory Technician

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Sieve Report

Project: Enselman Culvert Replacement
Project #: 16B013-08
Client: Aspect Consulting, LLC
Source: B-1 S-2 5'
Sample#: B16-1294

Date Received: 27-Oct-16
Sampled By: Other
Date Tested: 28-Oct-16
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SM, Silty Sand with Gravel
Sample Color:
dark red/brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

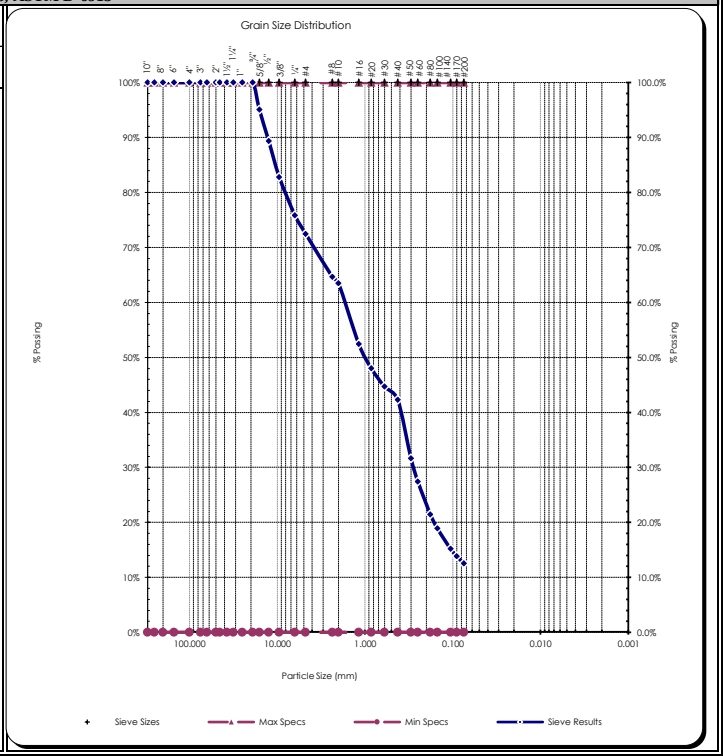
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.030 mm	% Gravel =	27.5%	Coeff. of Curvature, C_C =	0.76
$D_{(10)}$ =	0.060 mm	% Sand =	59.9%	Coeff. of Uniformity, C_U =	29.17
$D_{(15)}$ =	0.104 mm	% Silt & Clay =	12.6%	Fineness Modulus =	3.32
$D_{(30)}$ =	0.280 mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.996 mm	Plasticity Index =	n/a	Moisture %, as sampled =	8.5%
$D_{(60)}$ =	1.741 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	12.892 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	19/64	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		95%	100.0%	0.0%
1/2"	12.50	89%	89%	100.0%	0.0%
3/8"	9.50		83%	100.0%	0.0%
1/4"	6.30		76%	100.0%	0.0%
#4	4.75	72%	72%	100.0%	0.0%
#8	2.36		65%	100.0%	0.0%
#10	2.00	63%	63%	100.0%	0.0%
#16	1.18		52%	100.0%	0.0%
#20	0.850		48%	100.0%	0.0%
#30	0.600		45%	100.0%	0.0%
#40	0.425	42%	42%	100.0%	0.0%
#50	0.300		32%	100.0%	0.0%
#60	0.250		27%	100.0%	0.0%
#80	0.180		21%	100.0%	0.0%
#100	0.150	19%	19%	100.0%	0.0%
#140	0.106		15%	100.0%	0.0%
#170	0.090		14%	100.0%	0.0%
#200	0.075	13%	13%	100.0%	0.0%



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Comments: _____

Reviewed by: _____

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Sieve Report

Project: Enselman Culvert Replacement
Project #: 16B013-08
Client: Aspect Consulting, LLC
Source: B-1 S-7 17'
Sample#: B16-1295

Date Received: 27-Oct-16
Sampled By: Client
Date Tested: 28-Oct-16
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
GW-GC, Well-graded Gravel with Silty Clay and Sand
Sample Color:
gray/brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

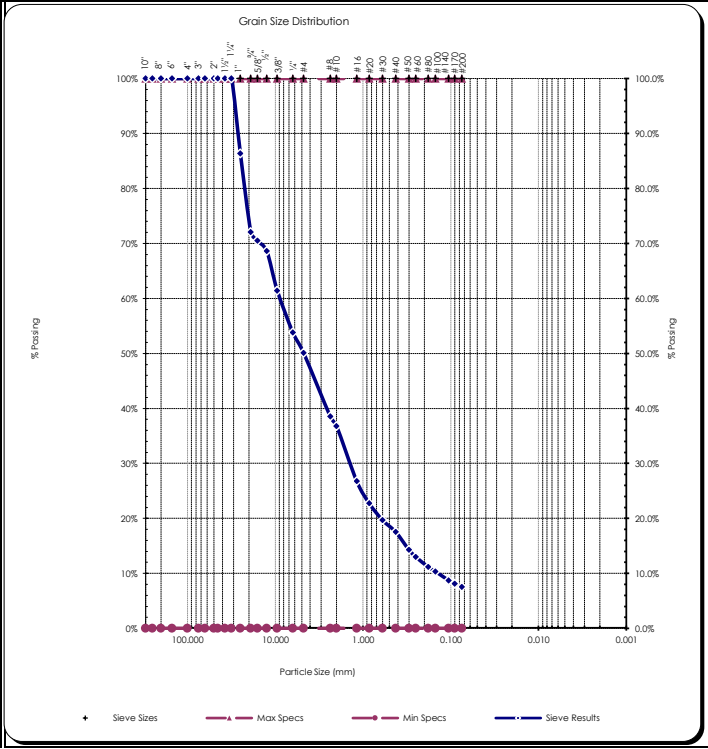
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.050 mm	% Gravel =	49.9%	Coeff. of Curvature, C_C =	1.68
$D_{(10)}$ =	0.140 mm	% Sand =	42.5%	Coeff. of Uniformity, C_U =	63.50
$D_{(15)}$ =	0.328 mm	% Silt & Clay =	7.6%	Fineness Modulus =	5.07
$D_{(30)}$ =	1.445 mm	Liquid Limit =	n/a	Plastic Limit =	0.0%
$D_{(50)}$ =	4.732 mm	Plasticity Index =	n/a	Moisture %, as sampled =	4.1%
$D_{(60)}$ =	8.894 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	26.718 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	0	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	86%	86%	100.0%	0.0%
3/4"	19.00	72%	72%	100.0%	0.0%
5/8"	16.00		71%	100.0%	0.0%
1/2"	12.50	69%	69%	100.0%	0.0%
3/8"	9.50		61%	100.0%	0.0%
1/4"	6.30		54%	100.0%	0.0%
#4	4.75	50%	50%	100.0%	0.0%
#8	2.36		39%	100.0%	0.0%
#10	2.00	37%	37%	100.0%	0.0%
#16	1.18		27%	100.0%	0.0%
#20	0.850		23%	100.0%	0.0%
#30	0.600		20%	100.0%	0.0%
#40	0.425	18%	18%	100.0%	0.0%
#50	0.300		14%	100.0%	0.0%
#60	0.250		13%	100.0%	0.0%
#80	0.180		11%	100.0%	0.0%
#100	0.150	10%	10%	100.0%	0.0%
#140	0.106		9%	100.0%	0.0%
#170	0.090		8%	100.0%	0.0%
#200	0.075	7.6%	7.6%	100.0%	0.0%



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Comments: _____

Reviewed by: _____

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Sieve Report

Project: Enselman Culvert Replacement
Project #: 16W038-01
Client: Aspect Consulting, LLC
Source: B-2 S-2 5'
Sample#: B16-1296

Date Received: 27-Oct-16
Sampled By: Client
Date Tested: 28-Oct-16
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SM, Silty Sand
Sample Color:
red/brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

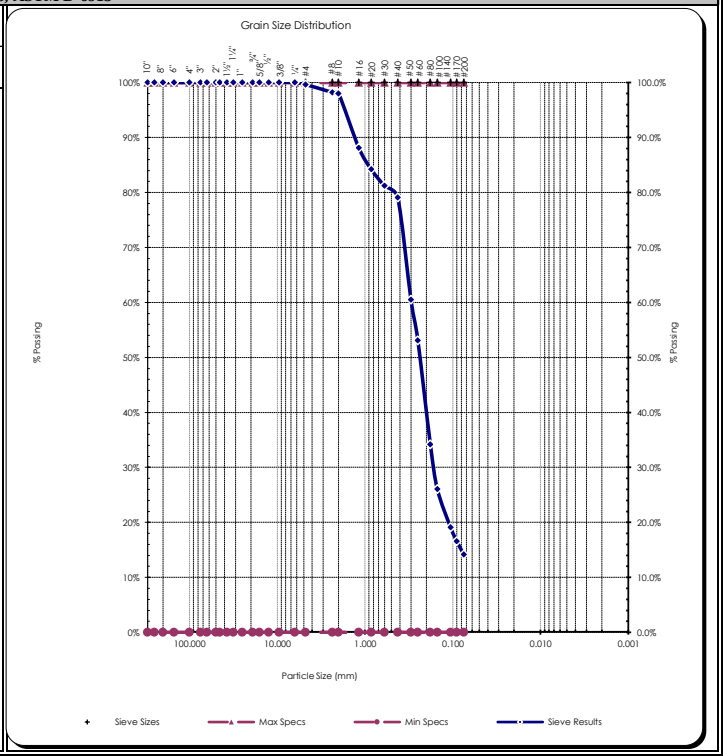
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.026	mm	% Gravel =	0.4%	Coeff. of Curvature, C_C = 1.73
$D_{(10)}$ =	0.053	mm	% Sand =	85.4%	Coeff. of Uniformity, C_U = 5.61
$D_{(15)}$ =	0.080	mm	% Silt & Clay =	14.2%	Fineness Modulus = 0.00
$D_{(30)}$ =	0.165	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	0.239	mm	Plasticity Index =	n/a	Moisture %, as sampled = 11.2%
$D_{(60)}$ =	0.296	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.334	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	0		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50		100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		88%	100.0%	0.0%
#20	0.850		84%	100.0%	0.0%
#30	0.600		81%	100.0%	0.0%
#40	0.425	79%	79%	100.0%	0.0%
#50	0.300		61%	100.0%	0.0%
#60	0.250	53%	53%	100.0%	0.0%
#80	0.180		34%	100.0%	0.0%
#100	0.150	26%	26%	100.0%	0.0%
#140	0.106		19%	100.0%	0.0%
#170	0.090		17%	100.0%	0.0%
#200	0.075	14.2%	14.2%	100.0%	0.0%



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Comments: _____

Reviewed by: _____

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Sieve Report

Project: Enselman Culvert Replacement
Project #: 16W038-01
Client: Aspect Consulting, LLC
Source: B-2 S-8 20'
Sample#: B16-1297

Date Received: 27-Oct-16
Sampled By: Client
Date Tested: 28-Oct-16
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SP-SM, Poorly graded Sand with Silt and Gravel
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

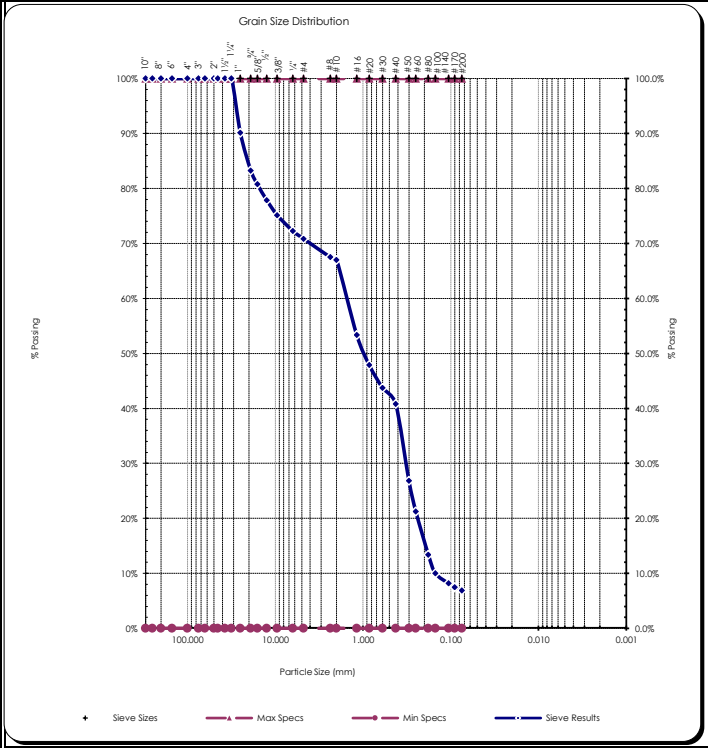
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.055 mm	% Gravel =	29.2%	Coeff. of Curvature, C_C =	0.46
$D_{(10)}$ =	0.149 mm	% Sand =	64.0%	Coeff. of Uniformity, C_U =	10.57
$D_{(15)}$ =	0.194 mm	% Silt & Clay =	6.9%	Fineness Modulus =	0.00
$D_{(30)}$ =	0.328 mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.977 mm	Plasticity Index =	n/a	Moisture %, as sampled =	17.9%
$D_{(60)}$ =	1.579 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	24.896 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	0	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	90%	90%	100.0%	0.0%
3/4"	19.00	83%	83%	100.0%	0.0%
5/8"	16.00		81%	100.0%	0.0%
1/2"	12.50	78%	78%	100.0%	0.0%
3/8"	9.50		75%	100.0%	0.0%
1/4"	6.30		72%	100.0%	0.0%
#4	4.75	71%	71%	100.0%	0.0%
#8	2.36		68%	100.0%	0.0%
#10	2.00	67%	67%	100.0%	0.0%
#16	1.18		53%	100.0%	0.0%
#20	0.850		48%	100.0%	0.0%
#30	0.600		44%	100.0%	0.0%
#40	0.425	41%	41%	100.0%	0.0%
#50	0.300		27%	100.0%	0.0%
#60	0.250		21%	100.0%	0.0%
#80	0.180		13%	100.0%	0.0%
#100	0.150	10%	10%	100.0%	0.0%
#140	0.106		8%	100.0%	0.0%
#170	0.090		8%	100.0%	0.0%
#200	0.075	6.9%	6.9%	100.0%	0.0%



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Comments: _____

Reviewed by: _____

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Sieve Report

Project: Enselman Culvert Replacement
Project #: 16W038-01
Client: Aspect Consulting, LLC
Source: B-3 S-1 5'
Sample#: B16-1298

Date Received: 27-Oct-16
Sampled By: Client
Date Tested: 28-Oct-16
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

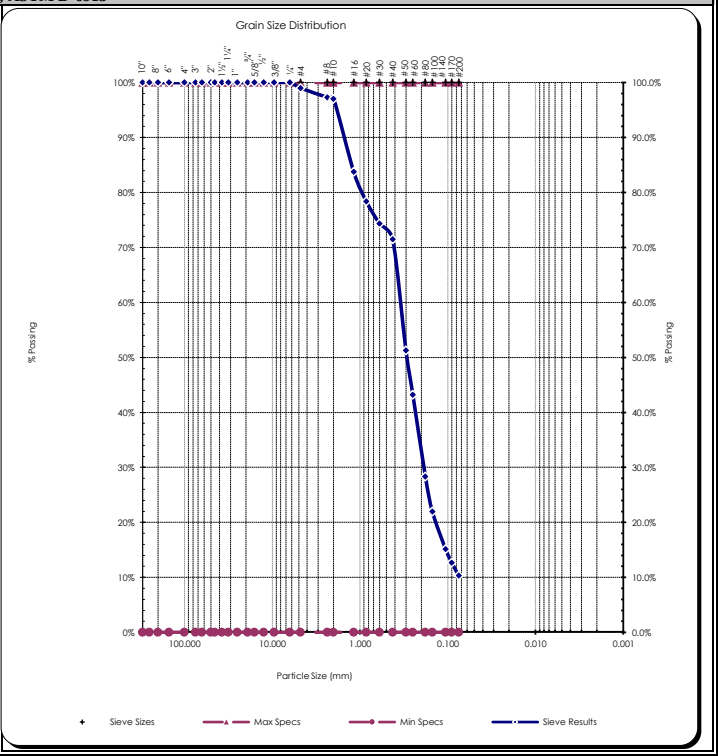
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.036 mm	% Gravel =	1.0%	Coeff. of Curvature, C_C =	1.37
$D_{(10)}$ =	0.073 mm	% Sand =	88.7%	Coeff. of Uniformity, C_U =	4.87
$D_{(15)}$ =	0.105 mm	% Silt & Clay =	10.3%	Fineness Modulus =	0.00
$D_{(30)}$ =	0.188 mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.292 mm	Plasticity Index =	n/a	Moisture %, as sampled =	10.2%
$D_{(60)}$ =	0.354 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	1.565 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	0	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50		100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		97%	100.0%	0.0%
#10	2.00	97%	97%	100.0%	0.0%
#16	1.18		84%	100.0%	0.0%
#20	0.850		78%	100.0%	0.0%
#30	0.600		74%	100.0%	0.0%
#40	0.425	72%	72%	100.0%	0.0%
#50	0.300		51%	100.0%	0.0%
#60	0.250	43%	43%	100.0%	0.0%
#80	0.180		28%	100.0%	0.0%
#100	0.150	22%	22%	100.0%	0.0%
#140	0.106		15%	100.0%	0.0%
#170	0.090		13%	100.0%	0.0%
#200	0.075	10%	10%	100.0%	0.0%



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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments:

Reviewed by:

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Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Sieve Report

Project: Enselman Culvert Replacement
Project #: 16W038-01
Client: Aspect Consulting, LLC
Source: MW-10-S10, 90' - 97'
Sample#: B16-1299

Date Received: 27-Oct-16
Sampled By: Client
Date Tested: 28-Oct-16
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SP, Poorly graded Sand with Gravel
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

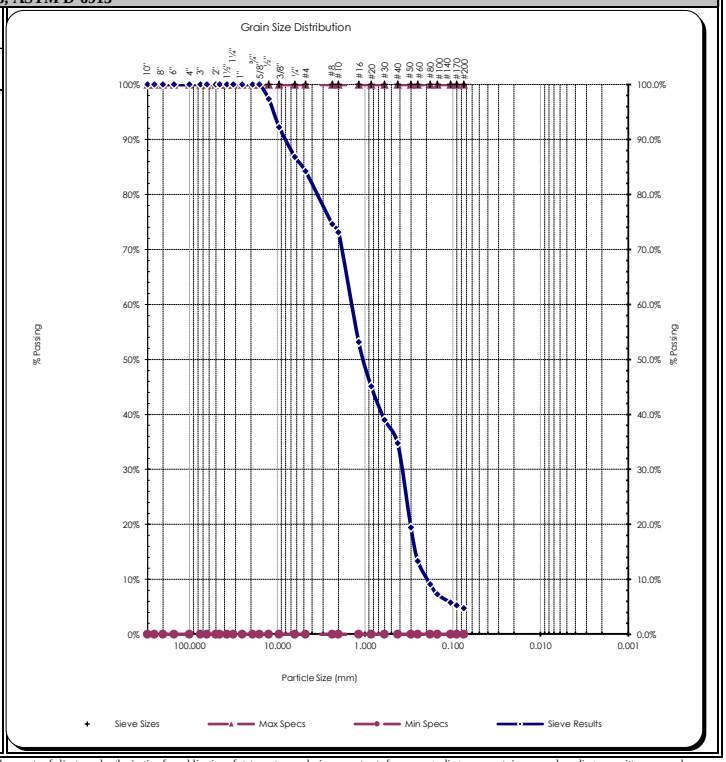
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.082	mm	% Gravel =	15.8%	Coeff. of Curvature, C_C = 0.52
$D_{(10)}$ =	0.195	mm	% Sand =	79.5%	Coeff. of Uniformity, C_U = 7.49
$D_{(15)}$ =	0.264	mm	% Silt & Clay =	4.7%	Fineness Modulus = 0.00
$D_{(30)}$ =	0.386	mm	Liquid Limit =	n/a	Plastic Limit = n/a
$D_{(50)}$ =	1.050	mm	Plasticity Index =	n/a	Moisture %, as sampled = 15.9%
$D_{(60)}$ =	1.461	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	8.172	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	0		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	97%	97%	100.0%	0.0%
3/8"	9.50		92%	100.0%	0.0%
1/4"	6.30		87%	100.0%	0.0%
#4	4.75	84%	84%	100.0%	0.0%
#8	2.36		75%	100.0%	0.0%
#10	2.00	73%	73%	100.0%	0.0%
#16	1.18		53%	100.0%	0.0%
#20	0.850		45%	100.0%	0.0%
#30	0.600		39%	100.0%	0.0%
#40	0.425	35%	35%	100.0%	0.0%
#50	0.300		19%	100.0%	0.0%
#60	0.250	13%	13%	100.0%	0.0%
#80	0.180		9%	100.0%	0.0%
#100	0.150	7%	7%	100.0%	0.0%
#140	0.106		6%	100.0%	0.0%
#170	0.090		5%	100.0%	0.0%
#200	0.075	4.7%	4.7%	100.0%	0.0%



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Comments: _____

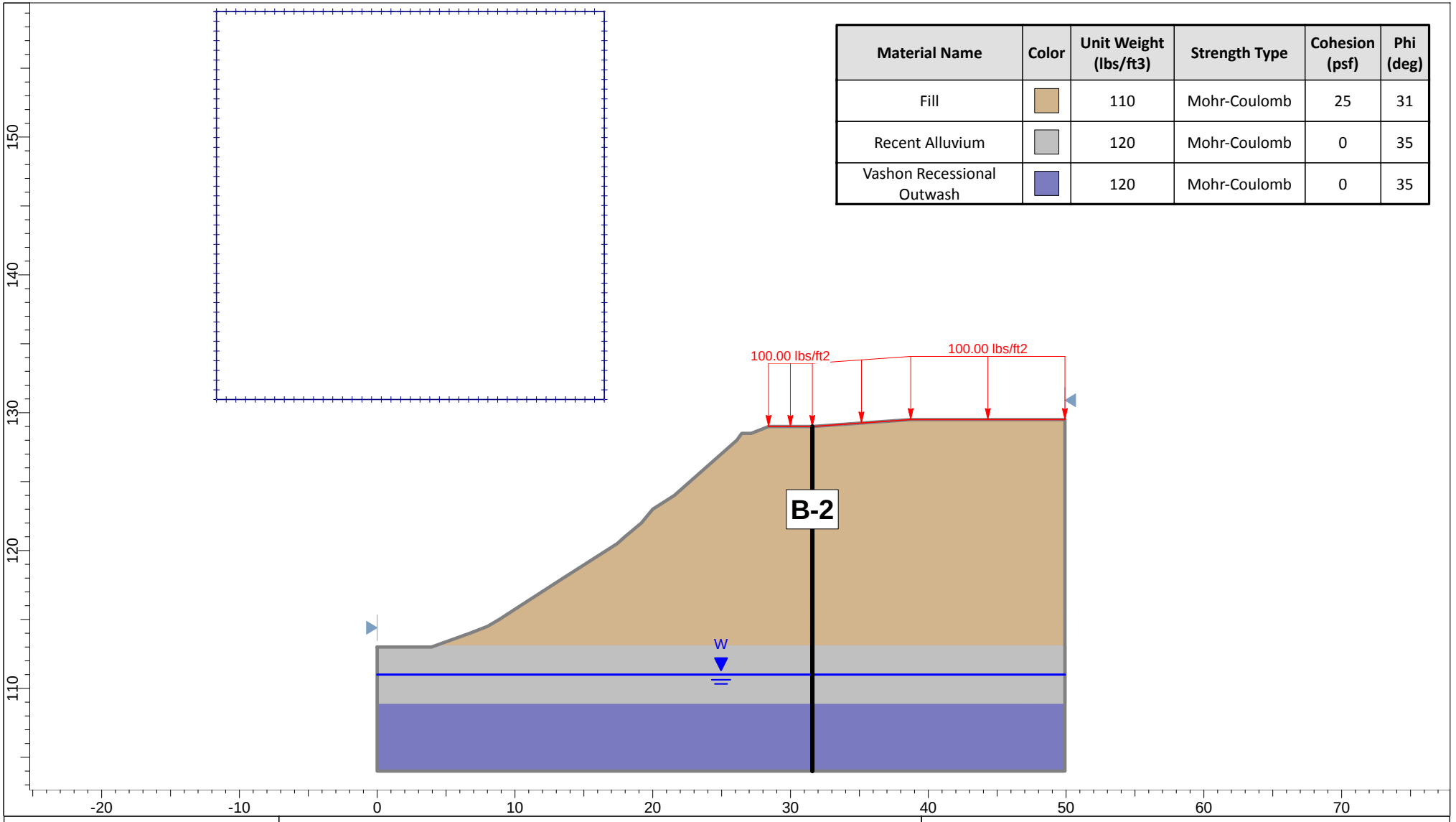
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APPENDIX C

Results of Global Slope Stability Analyses

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Fill		110	Mohr-Coulomb	25	31
Recent Alluvium		120	Mohr-Coulomb	0	35
Vashon Recessional Outwash		120	Mohr-Coulomb	0	35



Legend

- Search Grid
- Search Limits
- Modelled Groundwater Level
- Boring Location and Depth

A-A' Model Set Up

Slope Stability Analysis

Kackman Creek 55th Ave NE Culvert Replacement and Roadway Widening
Arlington, WA

SLIDE 8.020

SCALE: 1:120

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Aspect CONSULTING

3/12/2019

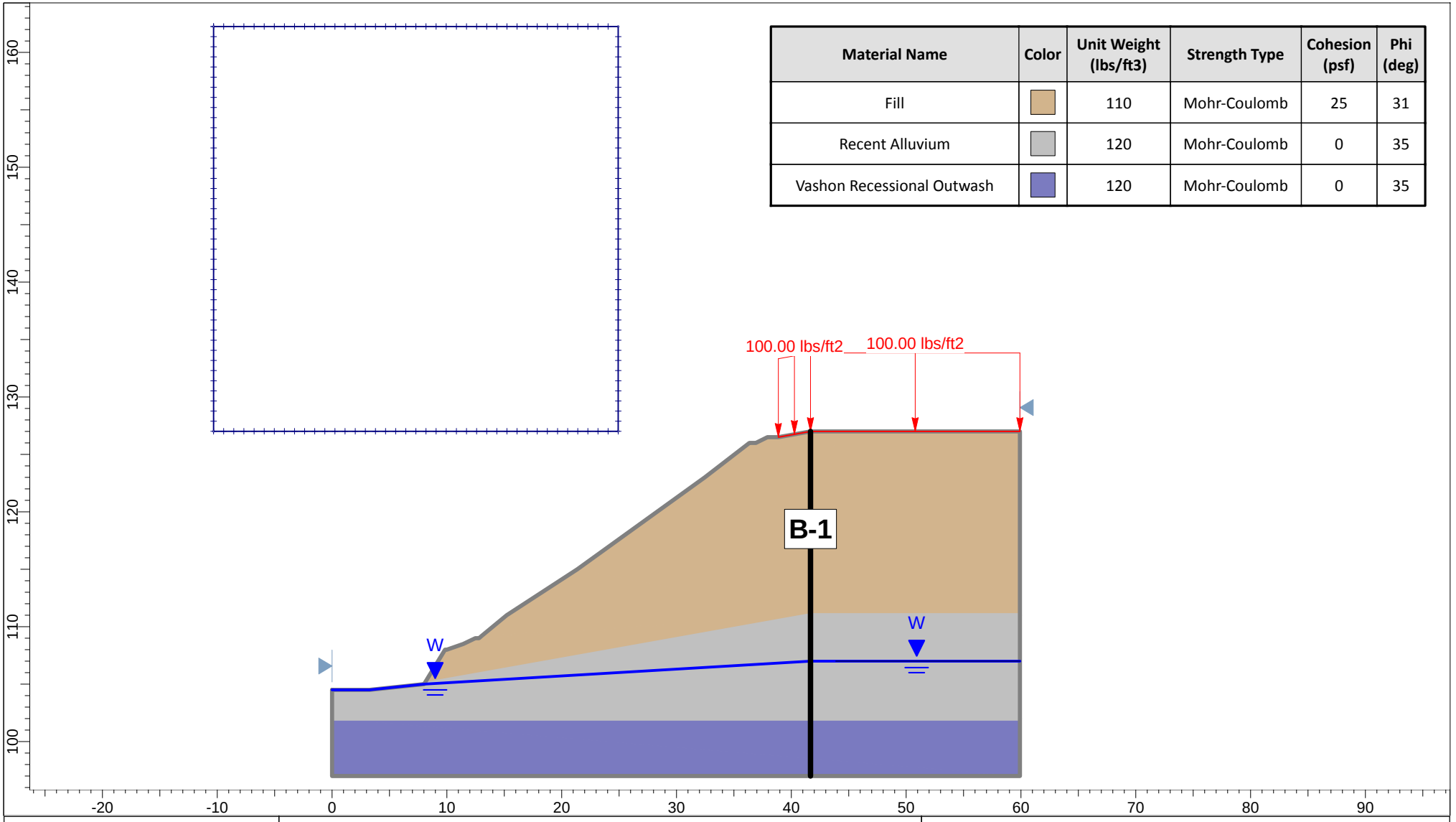
PROJECT NO. 160073

BY: ECS

REVISED BY: EOA

APPENDIX: **C-1**

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Fill		110	Mohr-Coulomb	25	31
Recent Alluvium		120	Mohr-Coulomb	0	35
Vashon Recessional Outwash		120	Mohr-Coulomb	0	35



Legend

- Search Grid
- Search Limits
- Modelled Groundwater Level
- Boring Location and Depth

B-B' Model Set Up

Slope Stability Analysis

Kackman Creek 55th Ave NE Culvert Replacement and Roadway Widening
Arlington, WA

SLIDE 8.020

SCALE: 1:144

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Aspect CONSULTING

3/12/2019

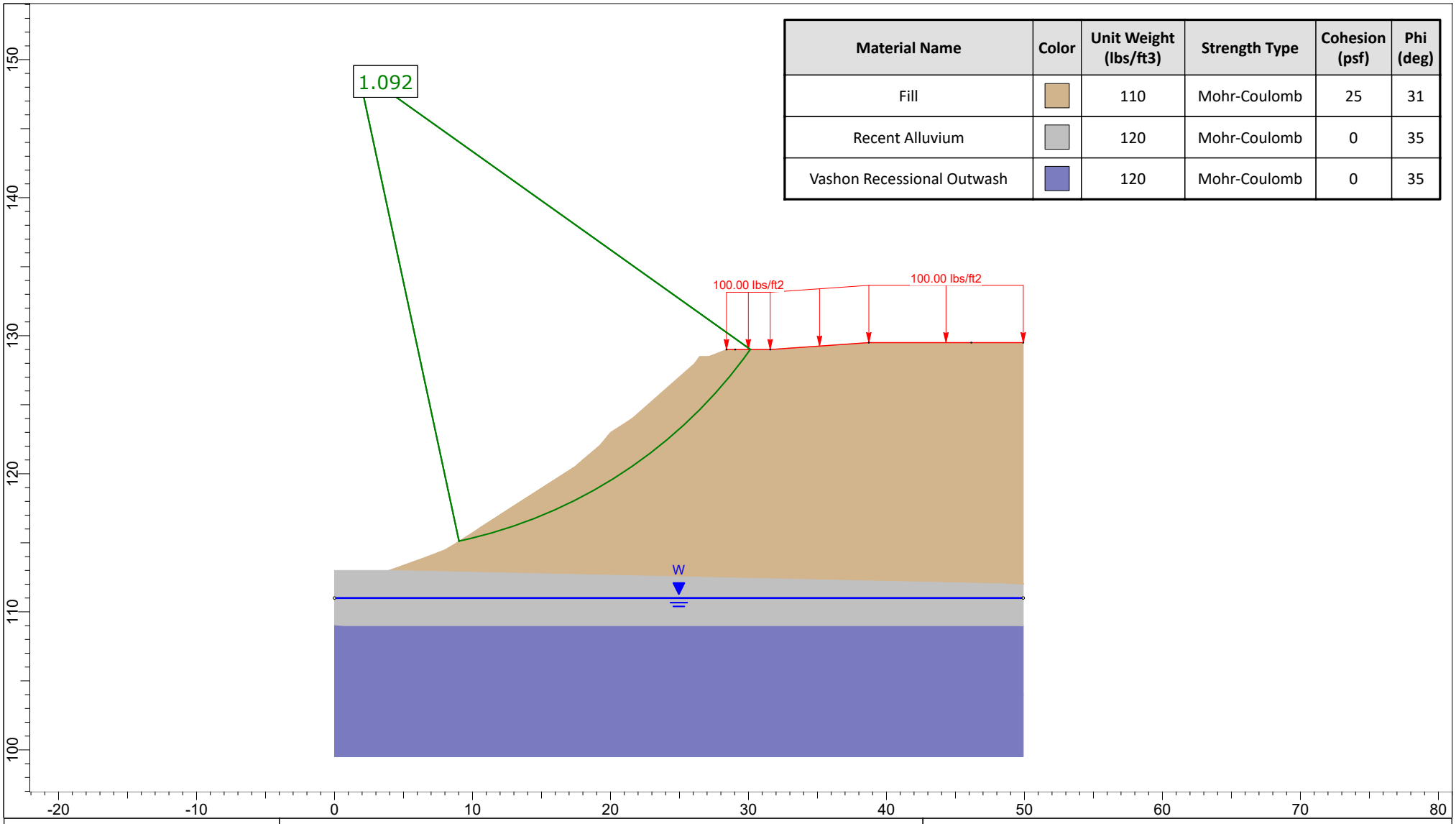
PROJECT NO. 160073

BY: ECS

REVISED BY: EOA

APPENDIX: **C-2**

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Fill		110	Mohr-Coulomb	25	31
Recent Alluvium		120	Mohr-Coulomb	0	35
Vashon Recessional Outwash		120	Mohr-Coulomb	0	35



Legend

- Search Grid
- Search Limits
- Modelled Groundwater Level
- Boring Location and Depth

A-A' - Existing Conditions
Static Conditions

Slope Stability Analysis

Kackman Creek 55th Ave NE Culvert
Replacement and Roadway Widening
Arlington, WA

SLIDEINTERPRET 8.022

SCALE: 1:120

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Aspect CONSULTING

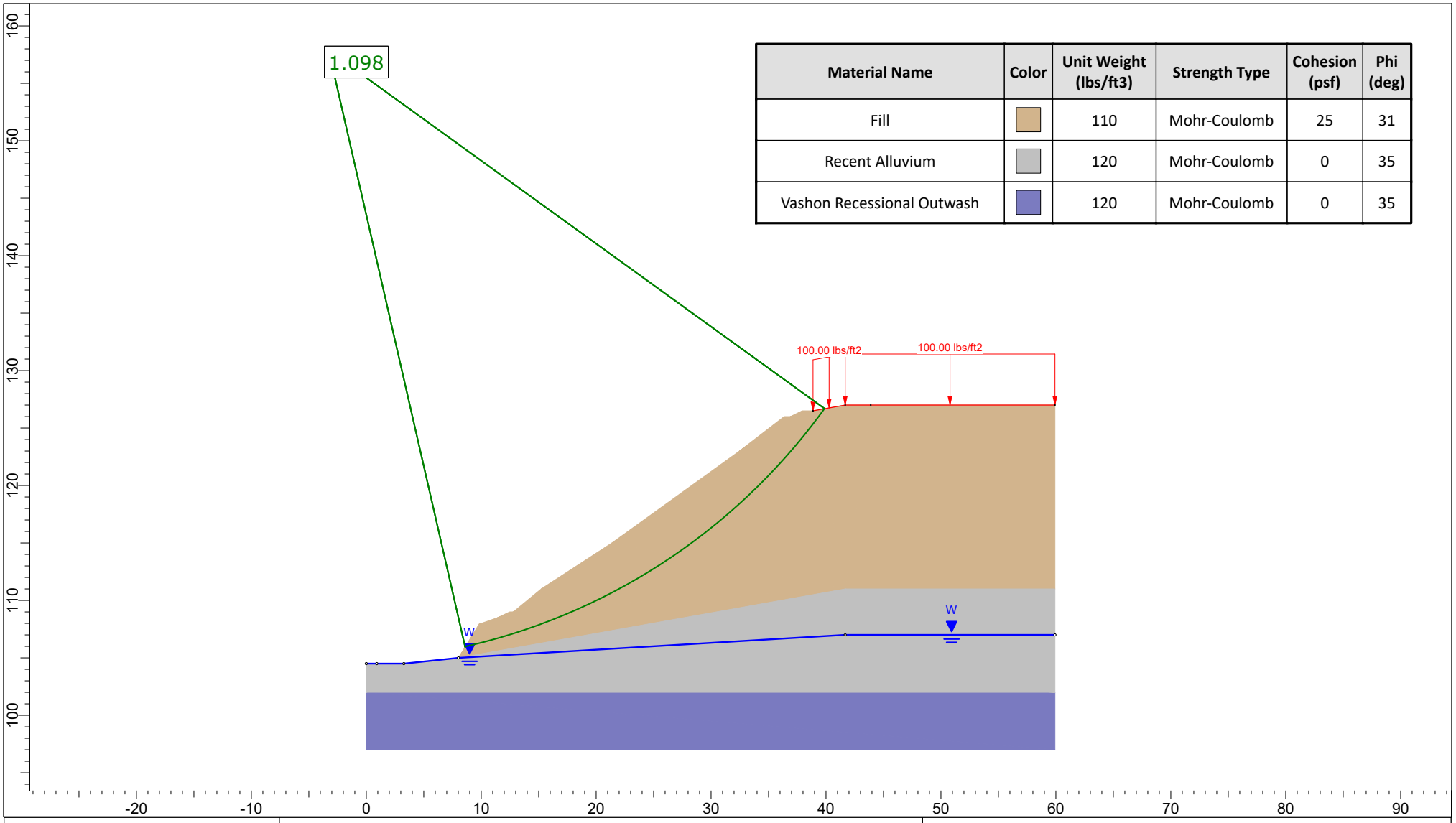
11/6/2019

PROJECT NO. 160073

BY: ECS

REVIEWED BY: EOA

APPENDIX: **C-3**



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Fill		110	Mohr-Coulomb	25	31
Recent Alluvium		120	Mohr-Coulomb	0	35
Vashon Recessional Outwash		120	Mohr-Coulomb	0	35

Legend

- Search Grid
- Search Limits
- Modelled Groundwater Level
- Boring Location and Depth

B-B' - Existing Conditions
Static Conditions

Slope Stability Analysis

Kackman Creek 55th Ave NE Culvert
Replacement and Roadway Widening
Arlington, WA

SLIDEINTERPRET 8.022

SCALE: 1:144

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Aspect CONSULTING

11/6/2019

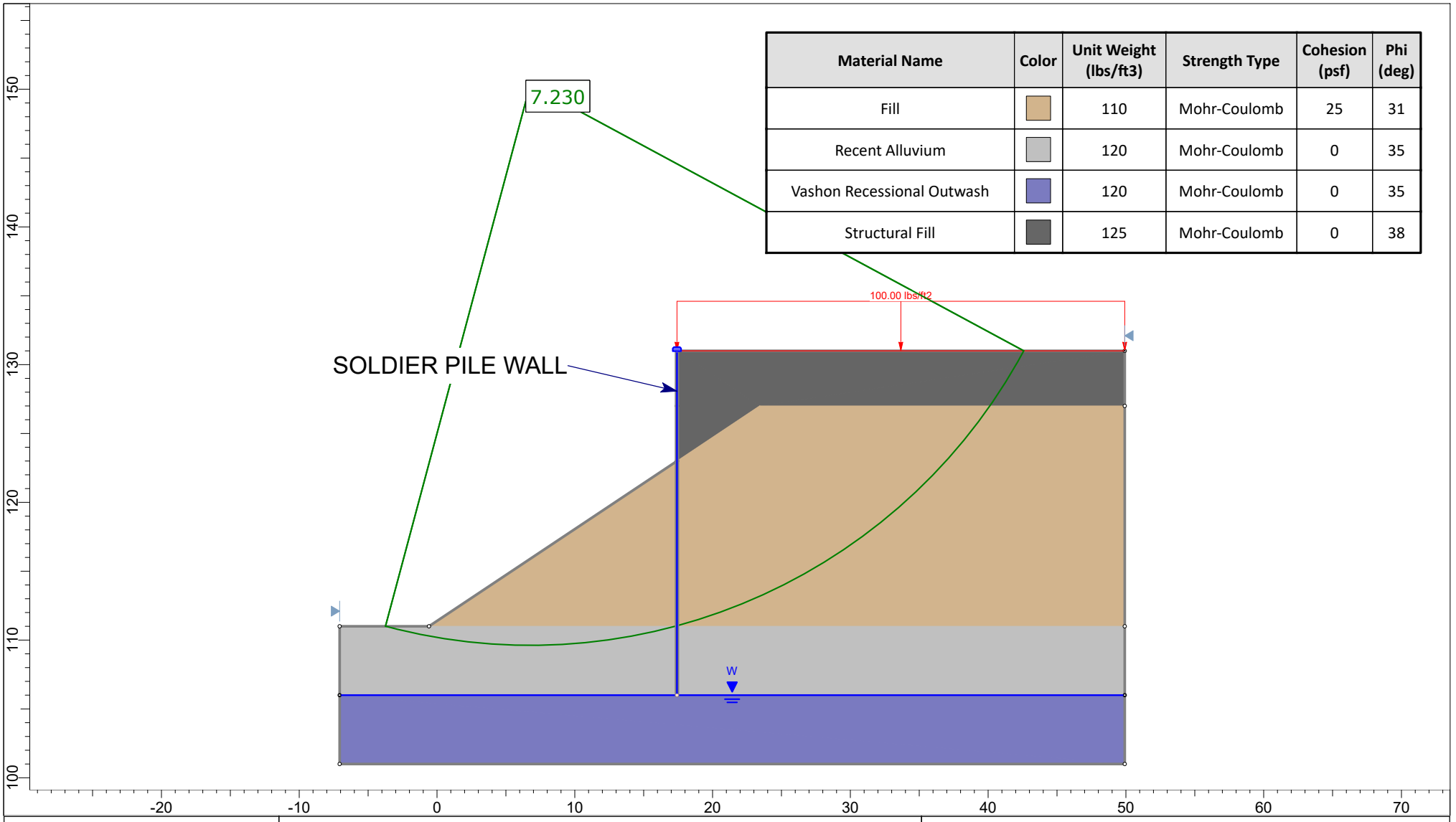
PROJECT NO. 160073

BY: ECS

REVIEWED BY: EOA

APPENDIX: **C-4**

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Fill		110	Mohr-Coulomb	25	31
Recent Alluvium		120	Mohr-Coulomb	0	35
Vashon Recessional Outwash		120	Mohr-Coulomb	0	35
Structural Fill		125	Mohr-Coulomb	0	38



Legend

- Search Grid
- Search Limits
- Modelled Groundwater Level
- Boring Location and Depth

West Soldier Pile Wall at North Abutment Static Conditions

Slope Stability Analysis

Kackman Creek 55th Ave NE Culvert Replacement and Roadway Widening
Arlington, WA

SLIDEINTERPRET 8.022

SCALE: 1:120

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Aspect CONSULTING

11/6/2019

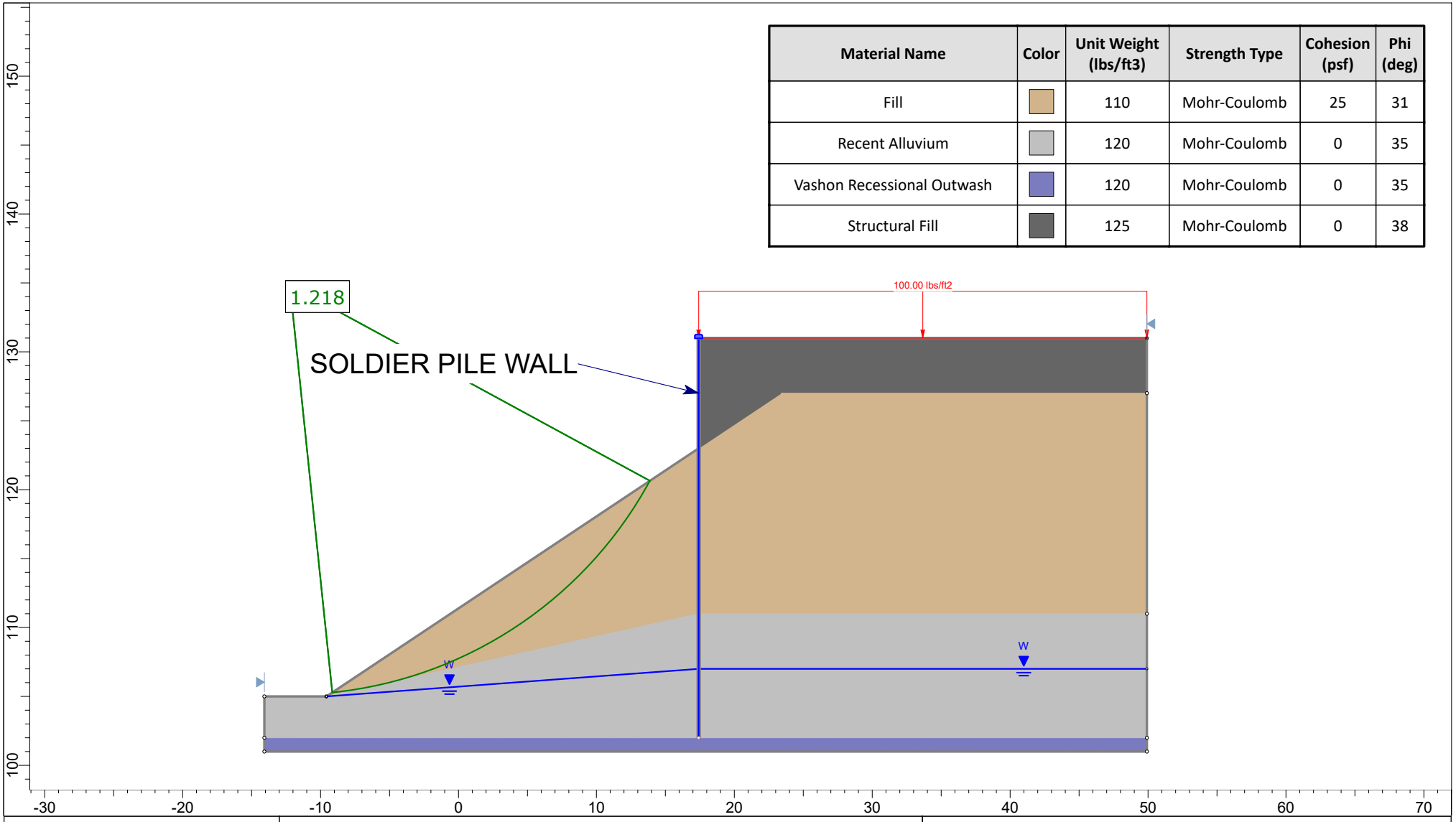
PROJECT NO. 160073

BY: ECS

REVIEWED BY: EOA

APPENDIX: **C-5**

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Fill		110	Mohr-Coulomb	25	31
Recent Alluvium		120	Mohr-Coulomb	0	35
Vashon Recessional Outwash		120	Mohr-Coulomb	0	35
Structural Fill		125	Mohr-Coulomb	0	38



Legend

- Search Grid
- Search Limits
- Modelled Groundwater Level
- Boring Location and Depth

B-B' East Soldier Pile Wall at South Abutment Static Conditions

Slope Stability Analysis

Kackman Creek 55th Ave NE Culvert Replacement and Roadway Widening
Arlington, WA

SLIDEINTERPRET 8.022

SCALE: 1:120

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11/6/2019

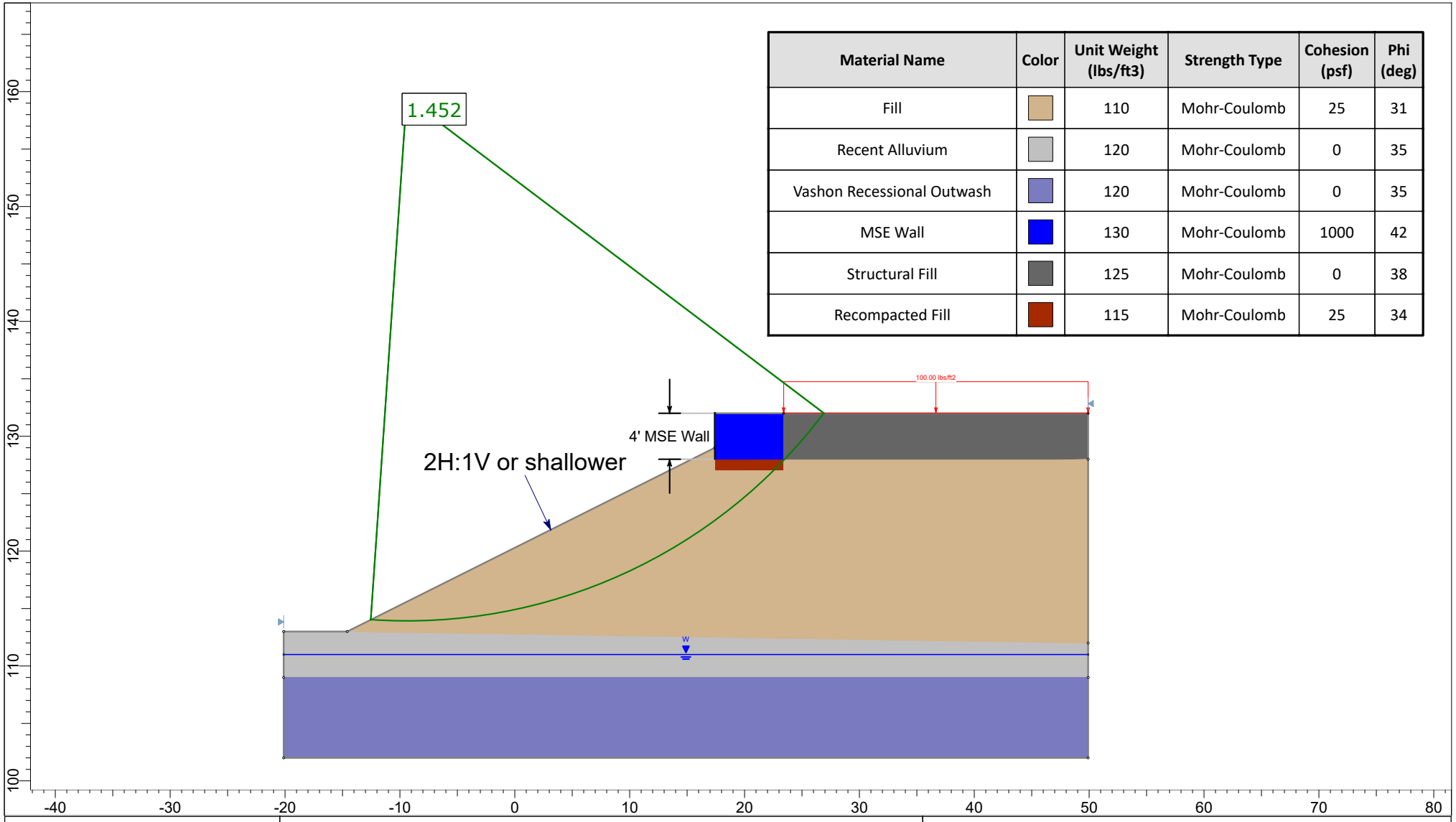
PROJECT NO. 160073

BY: ECS

REVIEWED BY: EOA

APPENDIX: **C-6**

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Fill		110	Mohr-Coulomb	25	31
Recent Alluvium		120	Mohr-Coulomb	0	35
Vashon Recessional Outwash		120	Mohr-Coulomb	0	35
MSE Wall		130	Mohr-Coulomb	1000	42
Structural Fill		125	Mohr-Coulomb	0	38
Recompacted Fill		115	Mohr-Coulomb	25	34



Legend

- Search Grid
- Search Limits
- Modelled Groundwater Level
- Boring Location and Depth

A-A' 4' MSE Wall Static Conditions

Slope Stability Analysis

Kackman Creek 55th Ave NE Culvert Replacement and Roadway Widening
Arlington, WA

SLIDEINTERPRET 8.022

SCALE: 1:144

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Aspect CONSULTING

11/6/2019

PROJECT NO. 160073

BY: ECS

REVIEWED BY: EOA

APPENDIX: **C-7**

APPENDIX D

Report Limitations and Guidelines for Use

REPORT LIMITATIONS AND GUIDELINES FOR USE

This Report and Project-Specific Factors

Aspect Consulting, LLC (Aspect) considered a number of unique, project-specific factors when establishing the Scope of Work for this project and report. You should not rely on this report if it was:

- Not prepared for you
- Not prepared for the specific purpose identified in the Agreement
- Not prepared for the specific real property assessed
- Completed before important changes occurred concerning the subject property, project or governmental regulatory actions

Geoscience Interpretations

The geoscience practices (geotechnical engineering, geology, and environmental science) require interpretation of spatial information that can make them less exact than other engineering and natural science disciplines. It is important to recognize this limitation in evaluating the content of the report. If you are unclear how these "Report Limitations and Use Guidelines" apply to your project or site, you should contact Aspect.

Reliance Conditions for Third Parties

This report was prepared for the exclusive use of the Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against liability claims by third parties with whom there would otherwise be no contractual limitations. Within the limitations of scope, schedule, and budget, our services have been executed in accordance with our Agreement with the Client and recognized geoscience practices in the same locality and involving similar conditions at the time this report was prepared.

Property Conditions Change Over Time

This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by events such as a change in property use or occupancy, or by natural events, such as floods, earthquakes, slope instability, or groundwater fluctuations. If any of the described events may have occurred following the issuance of the report, you should contact Aspect so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Discipline-Specific Reports Are Not Interchangeable

The equipment, techniques, and personnel used to perform a geotechnical or geologic study differ significantly from those used to perform an environmental study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually address any environmental findings, conclusions, or recommendations (e.g., about the likelihood of encountering underground storage tanks or regulated contaminants). Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding the subject property.

We appreciate the opportunity to perform these services. If you have any questions please contact the Aspect Project Manager for this project.

APPENDIX E

Permits

HYDRAULIC PROJECT APPROVAL

Washington Department of
Fish & Wildlife
PO Box 43234
Olympia, WA 98504-3234
(360) 902-2200

Issued Date: April 18, 2019
Project End Date: April 16, 2024

Permit Number: 2019-4-224+01
FPA/Public Notice Number: N/A
Application ID: 13074

PERMITTEE	AUTHORIZED AGENT OR CONTRACTOR
Stillaguamish Tribe of Indians	Herrera Environmental Consultants
ATTENTION: Carole Kirk	ATTENTION: Anna Hoenig
P.O. Box 277	2200 6th Ave
Arlington, WA 98223	Seattle, WA 98121-1867

Project Name: Kackman Creek Bridge Project at 55th Avenue Northeast

Project Description: Replace a failing 48-inch culvert that conveys Kackman Creek under 55th Avenue Northeast with a new bridge. To address structural, hydraulic and geomorphic, and fish passage issues at the road crossing, the proposed project will remove the failing culvert and three log weirs and will replace them with a bridge that will span a newly created roughened channel.

PROVISIONS

TIMING - PLANS - INVASIVE SPECIES CONTROL

1. TIMING LIMITATION: Work below the ordinary high water line must only occur between July 16 and September 15.

2. RE-VEGETATION: You must complete re-vegetation by no later than the first March following construction, and you must monitor the success of the re-vegetation for three years.

3. APPROVED PLANS: You must accomplish the work per plans and specifications submitted with the application and approved by the Washington Department of Fish and Wildlife, entitled Kackman Creek Bridge Project, dated November 2018, except as modified by this Hydraulic Project Approval. You must have a copy of these plans available on site during all phases of the project construction. You must also accomplish the work per the Biological Assessment dated 10 October 2018, and Critical Areas Study and Mitigation Plan for Kackman Creek Bridge Project, dated 26 November 2018.

4. INVASIVE SPECIES CONTROL: Follow Level 1 Decontamination protocol for low risk locations. Thoroughly remove visible dirt and organic debris from all equipment and gear (including drive mechanisms, wheels, tires, tracks, buckets and undercarriage) before arriving and leaving the job site to prevent the transport and introduction of invasive species. Properly dispose of any water and chemicals used to clean gear and equipment. For contaminated or high risk sites please refer to the Level 2 Decontamination protocol. You can find this and additional information in the Washington Department of Fish and Wildlife's "Invasive Species Management Protocols", available online at http://wdfw.wa.gov/publications/search.php?Cat=Aquatic Invasive Species.

NOTIFICATION REQUIREMENTS

5. PRE- AND POST-CONSTRUCTION NOTIFICATION: You, your agent, or contractor must contact the Washington Department of Fish and Wildlife by e-mail at HPAapplications@dfw.wa.gov; mail to Post Office Box 43234, Olympia, Washington 98504-3234; or fax to (360) 902-2946 at least three business days before starting work, and again within seven days after completing the work. The notification must include the permittee's name, project location, starting date for work or date the work was completed, and the permit number. The Washington Department of Fish and Wildlife may conduct inspections during and after construction; however, the Washington Department of Fish and Wildlife will notify you or your agent before conducting the inspection.

6. PHOTOGRAPHS: You, your agent, or contractor must take photographs of the job site before the work begins and

after the work is completed. You must upload the photographs to the post-permit requirement page in the Aquatic Protection Permitting System (APPS) or mail them to Washington Department of Fish and Wildlife at Post Office Box 43234, Olympia, Washington 98504-3234 within 30-days after the work is completed.

7. FISH KILL/ WATER QUALITY PROBLEM NOTIFICATION: If a fish kill occurs or fish are observed in distress at the job site, immediately stop all activities causing harm. Immediately notify the Washington Department of Fish and Wildlife of the problem. If the likely cause of the fish kill or fish distress is related to water quality, also notify the Washington Military Department Emergency Management Division at 1-800-258-5990. Activities related to the fish kill or fish distress must not resume until the Washington Department of Fish and Wildlife gives approval. The Washington Department of Fish and Wildlife may require additional measures to mitigate impacts.

8. PRE-CONSTRUCTION CONTRACTOR MEETING: You, your agent, or contractor must contact the Washington Department of Fish and Wildlife by e-mail at HPAapplications@dfw.wa.gov; mail to Post Office Box 43234, Olympia, Washington 98504-3234; or fax to (360) 902-2946 at least fourteen business days before starting work to arrange a pre-construction contractor meeting onsite. The notification must include the permittee's name, project location, starting date, and the Hydraulic Project Approval permit number.

STAGING, JOB SITE ACCESS, AND EQUIPMENT

9. Establish staging areas (used for equipment storage, vehicle storage, fueling, servicing, and hazardous material storage) in a location and manner that will prevent contaminants such as petroleum products, hydraulic fluid, fresh concrete, sediments, sediment-laden water, chemicals, or any other toxic or harmful materials from entering waters of the state.

10. Clearly mark boundaries to establish the limit of work associated with site access and construction.

11. Limit the removal of native bankline vegetation to the minimum amount needed to construct the project.

12. This Hydraulic Project Approval authorizes only the removal of the large woody vegetation shown in the approved plan. Clearly mark all large woody vegetation authorized for removal before starting work.

13. Confine the use of equipment to the specific access and work corridor shown in the approved plans.

14. Remove soil or debris from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to operating the equipment waterward of the ordinary high water line.

15. If wet or muddy conditions exist, in or near a riparian zone or wetland area, use equipment that reduces ground pressure.

16. Check equipment daily for leaks and complete any required repairs in an upland location before using the equipment in or near the water.

17. Use environmentally acceptable lubricants composed of biodegradable base oils such as vegetable oils, synthetic esters, and polyalkylene glycols in equipment operated in or near the water.

18. Equipment must cross the creek in the most direct route and in a manner that does the least damage to the bed, streambank and streambank vegetation. If needed, you must place planks, matting or other suitable clean temporary material on the bank when driving equipment into and out of the channel to prevent damage.

CONSTRUCTION-RELATED SEDIMENT, EROSION AND POLLUTION CONTAINMENT

19. Work in the dry watercourse (when no natural flow is occurring in the channel, or when flow is diverted around the job site).

20. Protect all disturbed areas from erosion. Maintain erosion and sediment control until all work and cleanup of the job site is complete.

21. All erosion control materials that will remain onsite must be composed of 100% natural biodegradable materials.

22. Straw used for erosion and sediment control, must be certified free of noxious weeds and their seeds.

23. Stop all hydraulic project activities except those needed to control erosion and siltation, if flow conditions arise that

will result in erosion or siltation of waters of the state.

24. Prevent project contaminants, such as petroleum products, hydraulic fluid, fresh concrete, sediments, sediment-laden water, chemicals, or any other toxic or harmful materials, from entering or leaching into waters of the state.

25. Route construction water (wastewater) from the project to an upland area above the limits of anticipated floodwater. Remove fine sediment and other contaminants before discharging the construction water to waters of the state.

26. Use tarps or other methods to prevent treated wood, sawdust, trimmings, drill shavings and other debris from contacting the bed or waters of the state.

27. Deposit waste material from the project, such as construction debris, silt, excess dirt, or overburden, in an upland area above the limits of anticipated floodwater unless the material is approved by the Washington Department of Fish and Wildlife for reuse in the project.

28. Do not burn wood treated with preservatives, trash, waste, or other deleterious materials waterward of the ordinary high water line.

29. Deposit all trash from the project at an appropriate upland disposal location.

CONSTRUCTION MATERIALS

30. Store all construction and deconstruction material in a location and manner that will prevent contaminants such as petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or harmful materials from entering waters of the state.

31. During construction you may stockpile construction material, except fresh concrete and petroleum products, waterward of the OWHL.

32. Use only clean, suitable material as fill material (no trash, debris, car bodies, tires, asphalt, concrete, etc.).

33. To prevent leaching, construct forms to contain any wet concrete. Place impervious material over wet concrete that will come in contact with waters of the state. Forms and impervious materials must remain in place until the concrete is cured.

34. Do not use wood treated with oil-type preservatives (creosote, pentachlorophenol) in any hydraulic project. You may use wood treated with waterborne preservatives (ACZA, ACQ) provided the wood is approved by the Western Wood Preservers Institute for use in the aquatic environment. Any use of treated wood in the aquatic environment must follow guidelines and best management practices available at www.wwpinstitute.org.

IN-WATER WORK AREA ISOLATION USING A TEMPORARY BYPASS

35. Isolate fish from the work area by using either a total or partial bypass to reroute the stream through a temporary channel or pipe.

36. Sequence the work to minimize the duration of dewatering.

37. Use the least-impacting feasible method to temporarily bypass water from the work area. Consider the physical characteristics of the site and the anticipated volume of water flowing through the work area.

38. The hydraulic capacity of the stream bypass must be equal to or greater than the 25-year peak flow event expected when the bypass will be operated.

39. Design the temporary bypass to minimize the length of the dewatered stream channel.

40. During all phases of bypass installation and decommissioning, maintain flows downstream of the project site to ensure survival of all downstream fish.

41. Install the temporary bypass before starting other construction work in the wetted perimeter.

42. Install a cofferdam or similar device at the upstream and downstream end of the bypass to prevent backwater from entering the work area.

43. Return diverted water to the channel immediately downstream of the work area. Dissipate flow energy from the

Washington Department of
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Olympia, WA 98504-3234
(360) 902-2200

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Application ID: 13074

diversion to prevent scour or erosion of the channel and bank.

44. If the diversion inlet is a gravity diversion that provides fish passage, place the diversion outlet where it facilitates gradual and safe reentry of fish into the stream channel.

45. If the bypass is a pumped diversion, once started it must run continuously until it is no longer necessary to bypass flows. This requires back-up pumps on-site and twenty-four-hour monitoring for overnight operation.

46. If the diversion inlet is a pump diversion in a fish-bearing stream, the pump intake structure must have a fish screen installed, operated, and maintained in accordance with RCW 77.57.010 and 77.57.070. Screen the pump intake with one of the following:
a) Perforated plate: 0.094 inch (maximum opening diameter);
b) Profile bar: 0.069 inch (maximum width opening); or
c) Woven wire: 0.087 inch (maximum opening in the narrow direction).
The minimum open area for all types of fish screens is twenty-seven percent. The screened intake facility must have enough surface area to ensure that the velocity through the screen is less than 0.4 feet per second. Maintain fish screens to prevent injury or entrapment of fish.

47. Remove fish screens on dewatering pumps in the isolated work area only after all fish are safe and excluded from the work area.

48. Isolate pump hose intakes with block nets so that fish cannot get near the intake.

FISH LIFE REMOVAL

49. All persons participating in capture and removal must have training, knowledge, and skills in the safe handling of fish life.

50. If electrofishing is conducted, a person with electrofishing training must be on-site to conduct or direct all electrofishing activities.

51. Place block nets upstream and downstream of the in-water work area before capturing and removing fish life.

52. Capture and safely move fish life from the work area to the nearest suitable free-flowing water.

STREAM BANK PROTECTION

53. Place large wood or other materials consistent with natural stream processes waterward of the ordinary high water line as shown in the approved plans.

54. Install the toe to protect the integrity of bank protection material.

55. Bury the base of the structure deep enough to prevent undermining.

56. The biotechnical bank protection technique design must withstand the 100-year peak flow.

57. Use fir, cedar, or other coniferous species to construct the log or rootwad fish habitat structure(s).

58. Complete all bank protection work prior to releasing the water flow to the project area.

BRIDGE

59. Locate the waterward face of all bridge elements including abutments, piers, pilings, sills, foundations, aprons, wing walls, and approach material landward of the ordinary high water line.

60. Minimize damage to the bed and banks when placing bridge stringers.

61. Use material for the approaches that is structurally stable and that will not harm fish life if it erodes into the water.

CHANNEL RELOCATION AND REALIGNMENT

62. Permanent new channel must be similar in length, width, depth, flood plain configuration, and gradient to the old channel. The new channel must incorporate habitat components, bed materials, channel morphology, and native or

other approved vegetation to provide equal or better habitat compared to that which previously existed in the old channel.

63. The streambed must include a sinuous low-flow channel expected under common conditions in the reach and a high-flow bench on both sides of the channel.

64. Before water is diverted into a permanent new channel, install approved habitat components and bed and bank protection materials to prevent erosion as shown in the approved plan.

65. Use fir, cedar, or other coniferous species to construct log or rootwad fish habitat structure(s).

66. Place the fish habitat structures in the low flow channel.

67. Size streambed material to mimic the gradation found in nearby reference channel reaches. The material must be well-graded (includes all size classes), non-porous, with 5-10% fines with sieve size U.S. No. 200 to prevent subsurface flow. Create a low-flow channel and a high-flow bench on both sides of the channel. Angular rock is not permitted within the channel.

68. The Habitat Biologist listed below or their representative must inspect and approve the new channel before the stream is diverted into the channel.

69. The owner(s) must monitor and maintain the channel to ensure it provides continued, unimpeded fish passage. If the channel becomes a hindrance to fish passage, the owner must obtain an Hydraulic Project Approval and provide prompt repair.

DEMOBILIZATION AND CLEANUP

70. Do not relocate removed or replaced structures within waters of the state. Remove and dispose of these structures in an upland area above the limits of anticipated floodwater.

71. To prevent fish from stranding, backfill trenches, depressions, and holes in the bed that may entrain fish during high water or wave action.

72. To minimize sediment delivery to the stream or stream channel, do not return in-stream flows to the work area until all in-channel work is completed and the bed and banks are stabilized.

73. Stabilize the bed with clean material sized to match undisturbed sediments.

74. Complete replanting of riparian vegetation during the first dormant season (late fall through late winter) after project completion per the approved plan. Maintain plantings for at least three years to ensure at least eighty percent of the plantings survive. Failure to achieve the eighty percent survival in year three will require you to submit a plan with follow-up measures to achieve requirements or reasons to modify requirements.

75. Upon completion of the project, remove all materials or equipment from the site and dispose of all excess spoils and waste materials in an upland area above the limits of anticipated floodwater.

76. Return water flow slowly to the in-water work area to prevent the downstream release of sediment laden water. If necessary, install silt fencing above the bypass outlet to capture sediment during re-watering of the channel.

77. Remove temporary erosion and sediment control methods after job site is stabilized or within three months of project completion, whichever is sooner.

LOCATION #1:	Site Name: Stillaguamish Tribal Trust Land 24410 55th Avenue Northeast, Arlington, WA 98223		
WORK START:	April 18, 2019	WORK END:	December 31, 2020
WRIA	Waterbody:		Tributary to:

HYDRAULIC PROJECT APPROVAL

Washington Department of
Fish & Wildlife
PO Box 43234
Olympia, WA 98504-3234
(360) 902-2200

Issued Date: April 18, 2019
Project End Date: April 16, 2024

Permit Number: 2019-4-224+01
FPA/Public Notice Number: N/A
Application ID: 13074

05 - Stillaguamish		Kackman Creek			Armstrong Creek	
1/4 SEC:	Section:	Township:	Range:	Latitude:	Longitude:	County:
NW 1/4	34	32 N	05 E	48.21766	-122.15580	Snohomish
Location #1 Driving Directions						
From Interstate 5 (I-5), take Exit 210 for 236th Street Northeast and head east. Turn north onto 19th Avenue Northeast/Kackman Road and follow for 3.3 miles. Turn south onto 55th Avenue Northeast.						

APPLY TO ALL HYDRAULIC PROJECT APPROVALS

This Hydraulic Project Approval pertains only to those requirements of the Washington State Hydraulic Code, specifically Chapter 77.55 RCW. Additional authorization from other public agencies may be necessary for this project. The person(s) to whom this Hydraulic Project Approval is issued is responsible for applying for and obtaining any additional authorization from other public agencies (local, state and/or federal) that may be necessary for this project.

This Hydraulic Project Approval shall be available on the job site at all times and all its provisions followed by the person (s) to whom this Hydraulic Project Approval is issued and operator(s) performing the work.

This Hydraulic Project Approval does not authorize trespass.

The person(s) to whom this Hydraulic Project Approval is issued and operator(s) performing the work may be held liable for any loss or damage to fish life or fish habitat that results from failure to comply with the provisions of this Hydraulic Project Approval.

Failure to comply with the provisions of this Hydraulic Project Approval could result in a civil penalty of up to one hundred dollars per day and/or a gross misdemeanor charge, possibly punishable by fine and/or imprisonment.

All Hydraulic Project Approvals issued under RCW 77.55.021 are subject to additional restrictions, conditions, or revocation if the Department of Fish and Wildlife determines that changed conditions require such action. The person(s) to whom this Hydraulic Project Approval is issued has the right to appeal those decisions. Procedures for filing appeals are listed below.

Washington Department of
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PO Box 43234
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MINOR MODIFICATIONS TO THIS HPA: You may request approval of minor modifications to the required work timing or to the plans and specifications approved in this HPA unless this is a General HPA. If this is a General HPA you must use the Major Modification process described below. Any approved minor modification will require issuance of a letter documenting the approval. A minor modification to the required work timing means any change to the work start or end dates of the current work season to enable project or work phase completion. Minor modifications will be approved only if spawning or incubating fish are not present within the vicinity of the project. You may request subsequent minor modifications to the required work timing. A minor modification of the plans and specifications means any changes in the materials, characteristics or construction of your project that does not alter the project's impact to fish life or habitat and does not require a change in the provisions of the HPA to mitigate the impacts of the modification. If you originally applied for your HPA through the online Aquatic Protection Permitting System (APPS), you may request a minor modification through APPS. A link to APPS is at http://wdfw.wa.gov/licensing/hpa/. If you did not use APPS you must submit a written request that clearly indicates you are seeking a minor modification to an existing HPA. Written requests must include the name of the applicant, the name of the authorized agent if one is acting for the applicant, the APP ID number of the HPA, the date issued, the permitting biologist, the requested changes to the HPA, the reason for the requested change, the date of the request, and the requestor's signature. Send by mail to: Washington Department of Fish and Wildlife, PO Box 43234, Olympia, Washington 98504-3234, or by email to HPAapplications@dfw.wa.gov. You should allow up to 45 days for the department to process your request.

MAJOR MODIFICATIONS TO THIS HPA: You may request approval of major modifications to any aspect of your HPA. Any approved change other than a minor modification to your HPA will require issuance of a new HPA. If you originally applied for your HPA through the online Aquatic Protection Permitting System (APPS), you may request a major modification through APPS. A link to APPS is at http://wdfw.wa.gov/licensing/hpa/. If you did not use APPS you must submit a written request that clearly indicates you are requesting a major modification to an existing HPA. Written requests must include the name of the applicant, the name of the authorized agent if one is acting for the applicant, the APP ID number of the HPA, the date issued, the permitting biologist, the requested changes to the HPA, the reason for the requested change, the date of the request, and the requestor's signature. Send your written request by mail to: Washington Department of Fish and Wildlife, PO Box 43234, Olympia, Washington 98504-3234. You may email your request for a major modification to HPAapplications@dfw.wa.gov. You should allow up to 45 days for the department to process your request.

APPEALS INFORMATION

If you wish to appeal the issuance, denial, conditioning, or modification of a Hydraulic Project Approval (HPA), Washington Department of Fish and Wildlife (WDFW) recommends that you first contact the department employee who issued or denied the HPA to discuss your concerns. Such a discussion may resolve your concerns without the need for further appeal action. If you proceed with an appeal, you may request an informal or formal appeal. WDFW encourages you to take advantage of the informal appeal process before initiating a formal appeal. The informal appeal process includes a review by department management of the HPA or denial and often resolves issues faster and with less legal complexity than the formal appeal process. If the informal appeal process does not resolve your concerns, you may advance your appeal to the formal process. You may contact the HPA Appeals Coordinator at (360) 902-2534 for more information.

A. INFORMAL APPEALS: WAC 220-660-460 is the rule describing how to request an informal appeal of WDFW actions taken under Chapter 77.55 RCW. Please refer to that rule for complete informal appeal procedures. The following information summarizes that rule.

HYDRAULIC PROJECT APPROVAL

Issued Date: April 18, 2019
Project End Date: April 16, 2024

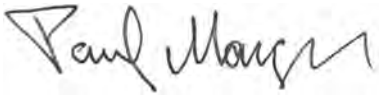
Permit Number: 2019-4-224+01
FPA/Public Notice Number: N/A
Application ID: 13074

A person who is aggrieved by the issuance, denial, conditioning, or modification of an HPA may request an informal appeal of that action. You must send your request to WDFW by mail to the HPA Appeals Coordinator, Department of Fish and Wildlife, Habitat Program, PO Box 43234, Olympia, Washington 98504-3234; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor. WDFW must receive your request within 30 days from the date you receive notice of the decision. If you agree, and you applied for the HPA, resolution of the appeal may be facilitated through an informal conference with the WDFW employee responsible for the decision and a supervisor. If a resolution is not reached through the informal conference, or you are not the person who applied for the HPA, the HPA Appeals Coordinator or designee may conduct an informal hearing or review and recommend a decision to the Director or designee. If you are not satisfied with the results of the informal appeal, you may file a request for a formal appeal.

B. FORMAL APPEALS: WAC 220-660-470 is the rule describing how to request a formal appeal of WDFW actions taken under Chapter 77.55 RCW. Please refer to that rule for complete formal appeal procedures. The following information summarizes that rule.

A person who is aggrieved by the issuance, denial, conditioning, or modification of an HPA may request a formal appeal of that action. You must send your request for a formal appeal to the clerk of the Pollution Control Hearings Boards and serve a copy on WDFW within 30 days from the date you receive notice of the decision. You may serve WDFW by mail to the HPA Appeals Coordinator, Department of Fish and Wildlife, Habitat Program, PO Box 43234, Olympia, Washington 98504-3234; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor. The time period for requesting a formal appeal is suspended during consideration of a timely informal appeal. If there has been an informal appeal, you may request a formal appeal within 30 days from the date you receive the Director's or designee's written decision in response to the informal appeal.

C. FAILURE TO APPEAL WITHIN THE REQUIRED TIME PERIODS: If there is no timely request for an appeal, the WDFW action shall be final and unappealable.

Habitat Biologist	Paul.Marczin@dfw.wa.gov		for Director
Paul Marczin	425-379-2303		WDFW

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, SEATTLE DISTRICT
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

Regulatory Branch June 14, 2019

Ms. Carole Kirk
Stillaguamish Tribe of Indians
P.O. Box 277
Arlington, Washington 98223

Reference: NWS-2018-1142
Stillaguamish Tribe of Indians
(Kackman Creek Bridge)

Dear Ms. Kirk:

We have reviewed your application to place 38 cubic yards of fill in 1,247 square feet of Wetlands E, F, and G and 15 cubic yards of fill in Kackman Creek to replace a 48-inch diameter culvert with a 50-foot clear span bridge and modify a stream channel in Kackman Creek near Arlington, Snohomish County, Washington. Based on the information you provided to us, Nationwide Permit (NWP) 27, *Aquatic Habitat Restoration, Establishment, and Enhancement Activities* (Federal Register January 6, 2017, Vol. 82, No. 4), authorizes your proposal as depicted on the enclosed drawings dated November 2018.

In order for this authorization to be valid, you must ensure the work is performed in accordance with the enclosed *NWP29, Terms and Conditions* and the following special conditions:

a. You must implement and abide by the Endangered Species Act (ESA) requirements and/or agreements set forth in the Biological Evaluation for Informal ESA Consultation dated October 10, 2108 in its entirety. The National Marine Fisheries Service (NMFS) provided the enclosed Letter of Concurrence (LOC) with a finding of "may affect, not likely to adversely affect" based on this document on March 14, 2019 (NMFS Reference Number WCR-2019-11528). The U.S. Fish and Wildlife Service (USFWS) provided the enclosed LOC with a finding of "may affect, not likely to adversely affect" based on this document on March 4, 2019 (USFWS Reference Number 01EWFW00-2019-I-0556). Both agencies will be informed of this permit issuance. Failure to comply with the commitments made in this consultation constitutes non-compliance with the ESA and your U.S. Army Corps of Engineers permit. The USFWS/NMFS is the appropriate authority to determine compliance with ESA.

b. You shall implement and abide by the Monitoring and Inadvertent Discovery Plan, Stillaguamish Village Phase I- Kackman Bridge Replacement Project dated May 15, 2019. A professional archaeologist shall be on-site to monitor for the presence of archaeological resources during all ground disturbing activities.

c. In order to meet the requirements of the Endangered Species Act you may conduct the authorized activities from July 1 through August 31 in any year this permit is valid. You shall not conduct work authorized by this permit from September 1 through June 30 in any year this permit is valid.

d. Incidents where any individuals of fish species, marine mammals and/or sea turtles listed by National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) under the Endangered Species Act appear to be injured or killed as a result of discharges of dredged or fill material into waters of the U.S. or structures or work in navigable waters of the U.S. authorized by this Nationwide Permit verification shall be reported to NOAA Fisheries, Office of Protected Resources at (301) 713-1401 and the Regulatory Office of the Seattle District of the U.S. Army Corps of Engineers at (206) 764-3495. The finder should leave the animal alone, make note of any circumstances likely causing the death or injury, note the location and number of individuals involved and, if possible, take photographs. Adult animals should not be disturbed unless circumstances arise where they are obviously injured or killed by discharge exposure or some unnatural cause. The finder may be asked to carry out instructions provided by NOAA Fisheries to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

We have reviewed your project pursuant to the requirements of the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act and the National Historic Preservation Act. We have determined this project complies with the requirements of these laws provided you comply with all of the permit general and special conditions.

As part of our permit application review process, we notified Native American tribes that have an interest in this area. The Stillaguamish Tribe of Indians requested their archeology staff be present to observe construction. Based on our coordination, you agreed to allow the Stillaguamish Tribe of Indians access. Please contact Kerry Lyste at (360) 572-3072 prior to commencing construction.

The authorized work complies with the Washington State Department of Ecology's (Ecology) Water Quality Certification (WQC) requirements and Coastal Zone Management (CZM) consistency determination response for this NWP. No further coordination with Ecology for WQC and CZM is required.

You have not requested a jurisdictional determination for this proposed project. If you believe the U.S. Army Corps of Engineers does not have jurisdiction over all or portions of your project you may request a preliminary or approved jurisdictional determination (JD). If one is requested, please be aware that we may require the submittal of additional information to complete the JD and work authorized in this letter may not occur until the JD has been completed.

Our verification of this NWP authorization is valid until March 18, 2022, unless the NWP is modified, reissued, or revoked prior to that date. If the authorized work has not been completed by that date and you have commenced or are under contract to commence this activity before March 18, 2022, you will have until March 18, 2023, to complete the activity under the enclosed terms and conditions of this NWP. Failure to comply with all terms and conditions of this NWP verification invalidates this authorization and could result in a violation of Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. You must also obtain all local, State, and other Federal permits that apply to this project.

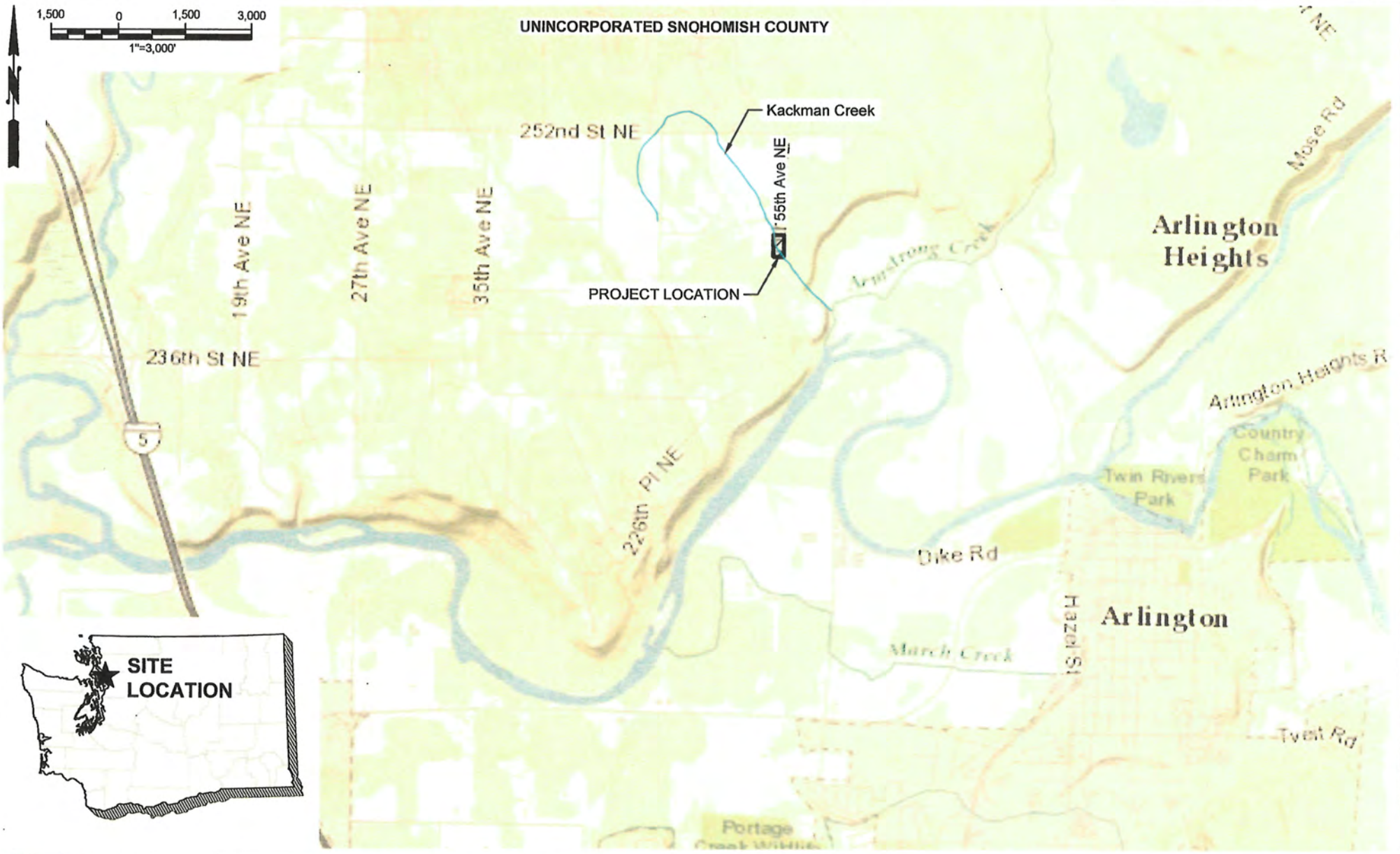
Upon completing the authorized work, you must fill out and return the enclosed *Certificate of Compliance with Department of the Army Permit*. Thank you for your cooperation during the permitting process. We are interested in your experience with our Regulatory Program and encourage you to complete a customer service survey. These documents and information about our program are available on our website at www.nws.usace.army.mil, select "Regulatory Branch, Permit Information" and then "Contact Us." A copy of this letter with enclosures will be furnished to Ms. Christina Avolio at cavolio@herrerainc.com. If you have any questions, please contact me at kathryn.heard@usace.army.mil or (206) 764-6071.

Sincerely,

Katie Heard

Katie Heard, Project Manager
Regulatory Branch

Enclosures



HERRERA PREPARED BY HERRERA ENVIRONMENTAL CONSULTANTS DATE OF PRINT: 11/7/2018 1:16 PM - BY: ERIC MARSHALL - FILE LOCATION: O:\proj\Y2015\15-06057-005\CAD\Dwg\Kackman JARPA\01-Vicinity.dwg

VICINITY MAP

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stuləgʷaʔbš VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

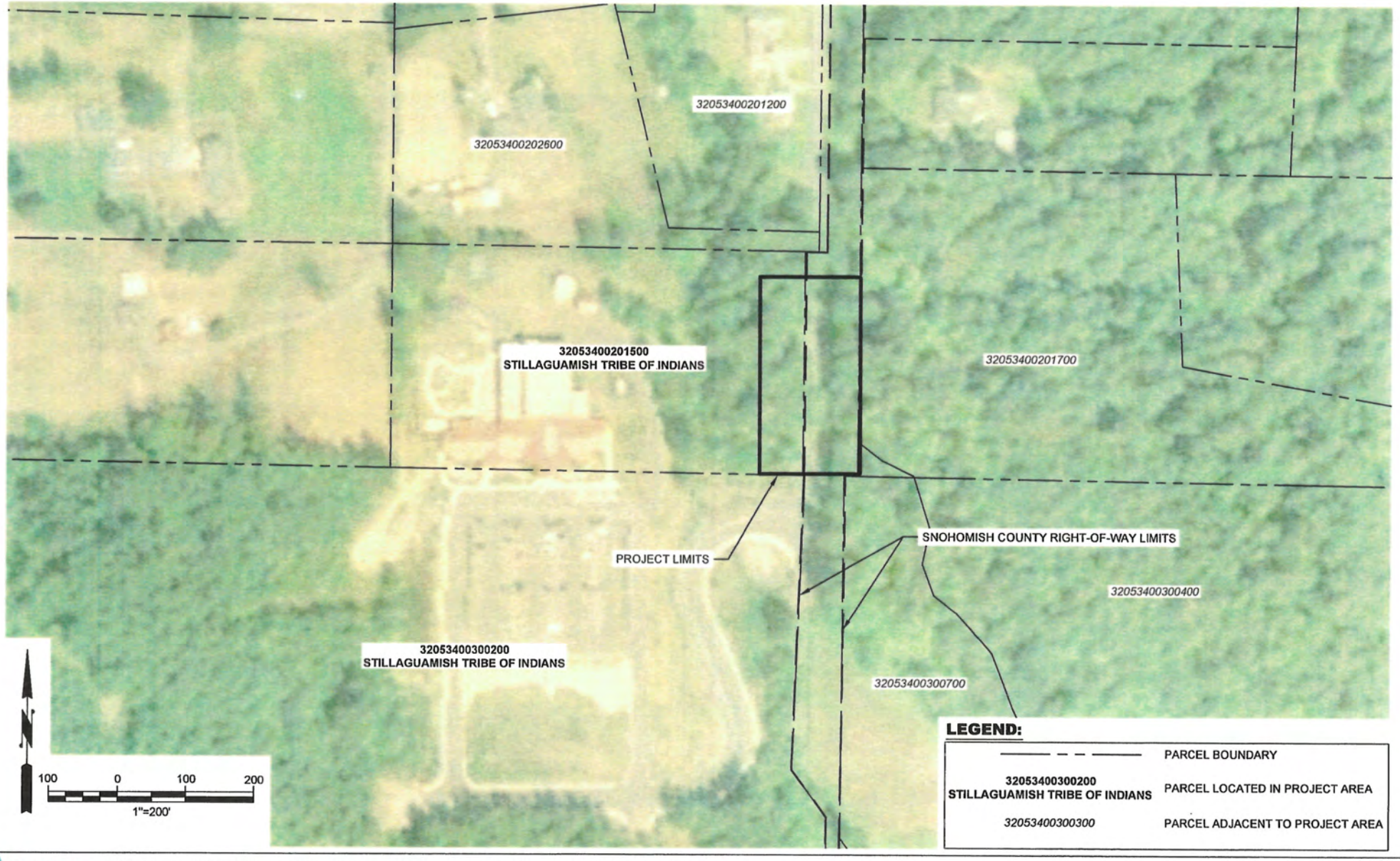
(360) 652-7362

NWS-2018-1142

FIGURE 01

STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 01 OF: 14 DATE: NOVEMBER 2018



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PARCEL MAP

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stuləgʷaʔbš VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

(360) 652-7362

NWS-2018-1142

FIGURE 02

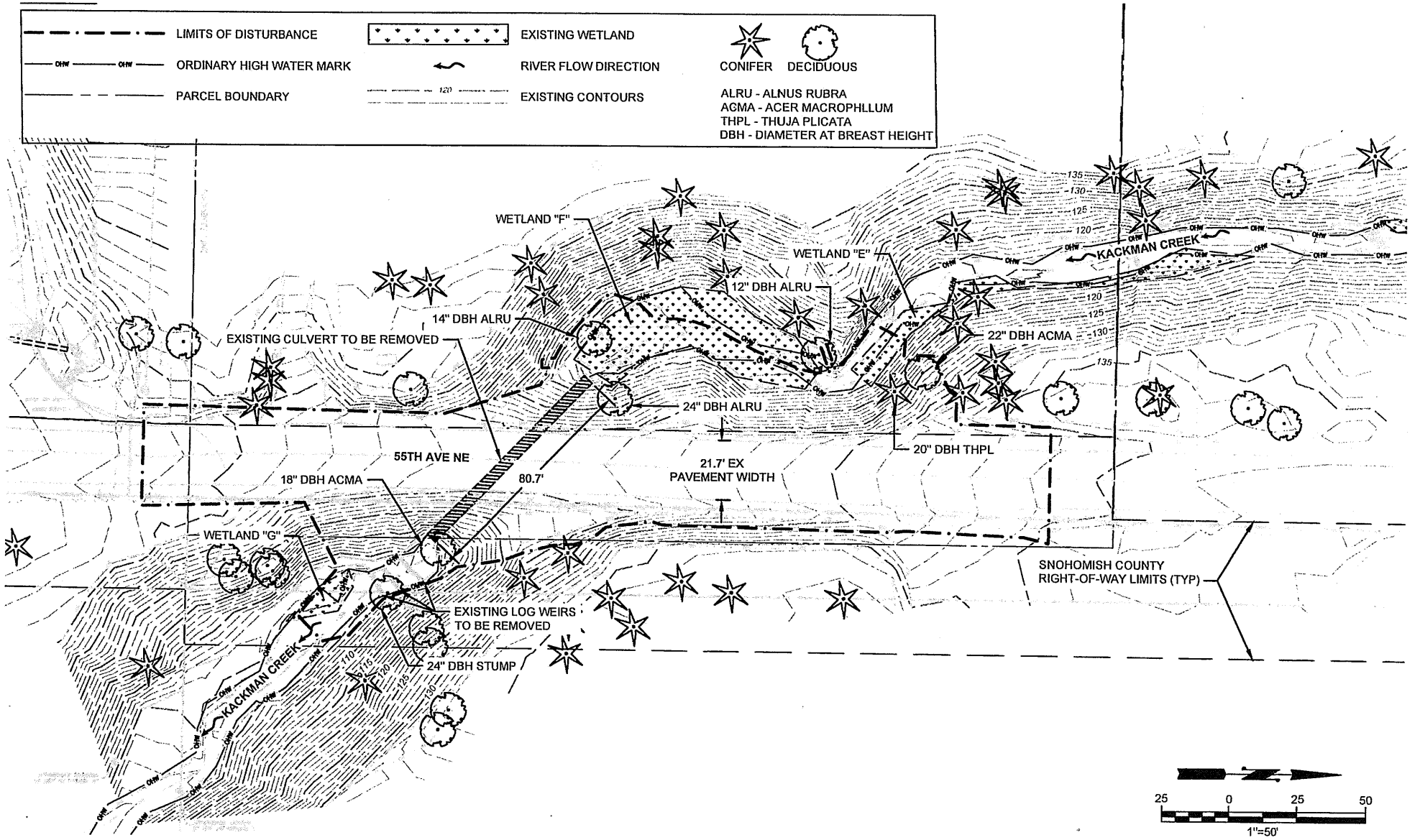
STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 02 OF: 14 DATE: NOVEMBER 2018

LEGEND:

- LIMITS OF DISTURBANCE
- ORDINARY HIGH WATER MARK (OHW)
- PARCEL BOUNDARY
- EXISTING WETLAND
- RIVER FLOW DIRECTION
- EXISTING CONTOURS (120)
- CONIFER
- DECIDUOUS

ALRU - ALNUS RUBRA
ACMA - ACER MACROPHLLUM
THPL - THUJA PLICATA
DBH - DIAMETER AT BREAST HEIGHT



HERRERA PREPARED BY HERRERA ENVIRONMENTAL CONSULTANTS DATE OF PRINT: 11/7/2018 1:16 PM - BY: ERIC MARSHALL - FILE LOCATION: O:\proj\Y2015\15-06057-005\CAD\Dwg\Kackman JARPA\03-Existing Conditions.dwg

EXISTING CONDITIONS

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH
stuləgʷaʔbš
VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

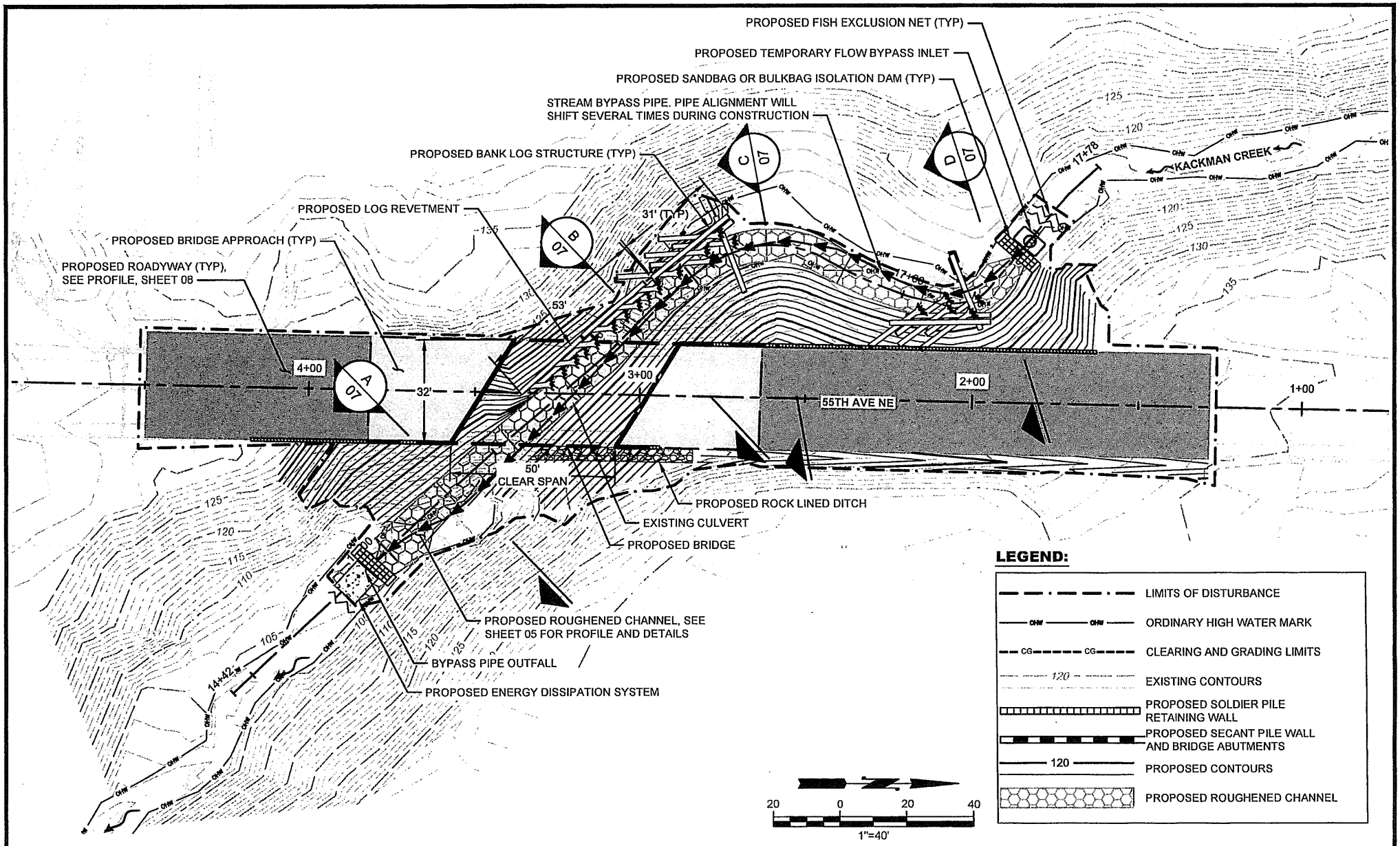
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FIGURE 03

STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 03 OF: 14 DATE: NOVEMBER 2018



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SITE PLAN

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stuləgʷaʔbš VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

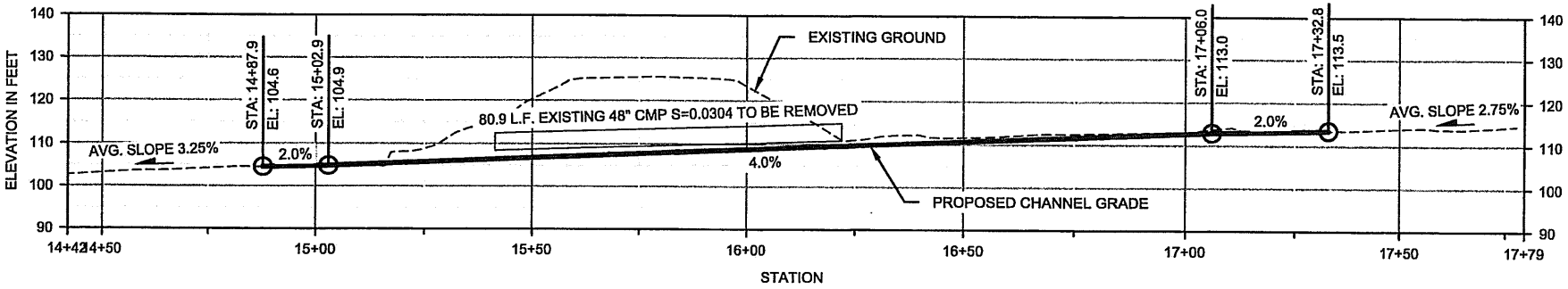
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FIGURE 04

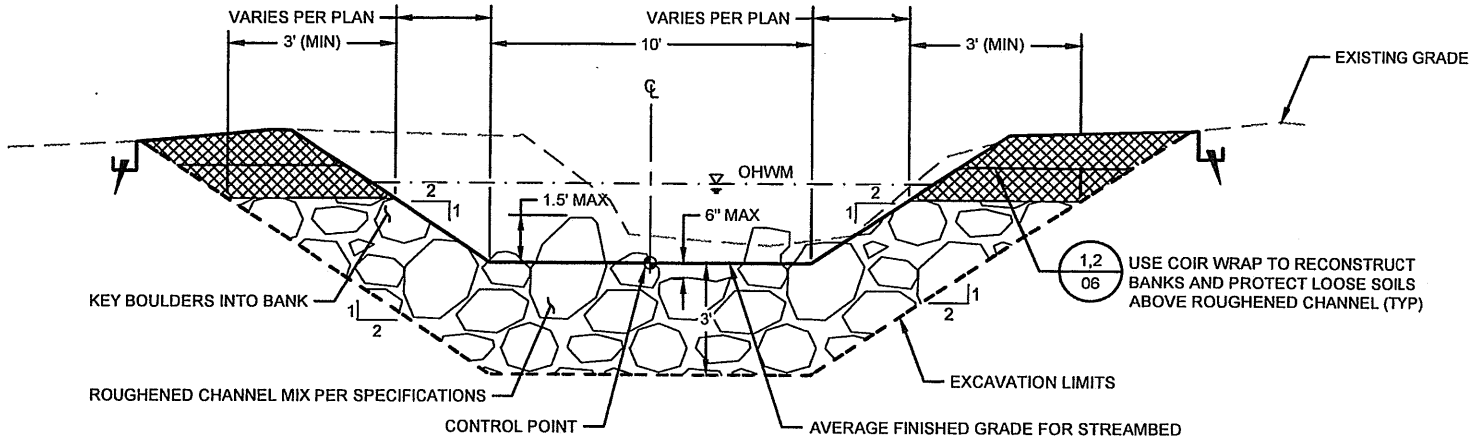
STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 04 OF: 14 DATE: NOVEMBER 2018



PROFILE - KACKMAN CREEK PROPOSED CHANNEL

HORIZ. SCALE: 1"=40'
VERT. SCALE: 1"=40'



DETAIL - TYPICAL ROUGHENED CHANNEL (1 / -)

SCALE: NTS

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CHANNEL PROFILE AND DETAILS

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stulǝgʷa'bš VILLAGE

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ARLINGTON, WA 98223

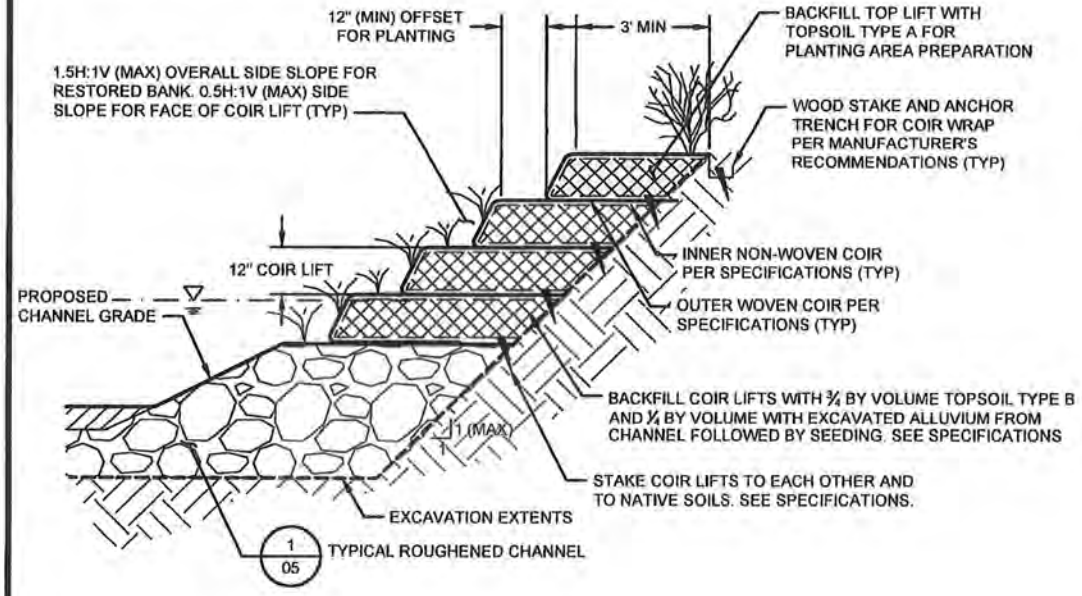
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FIGURE 05

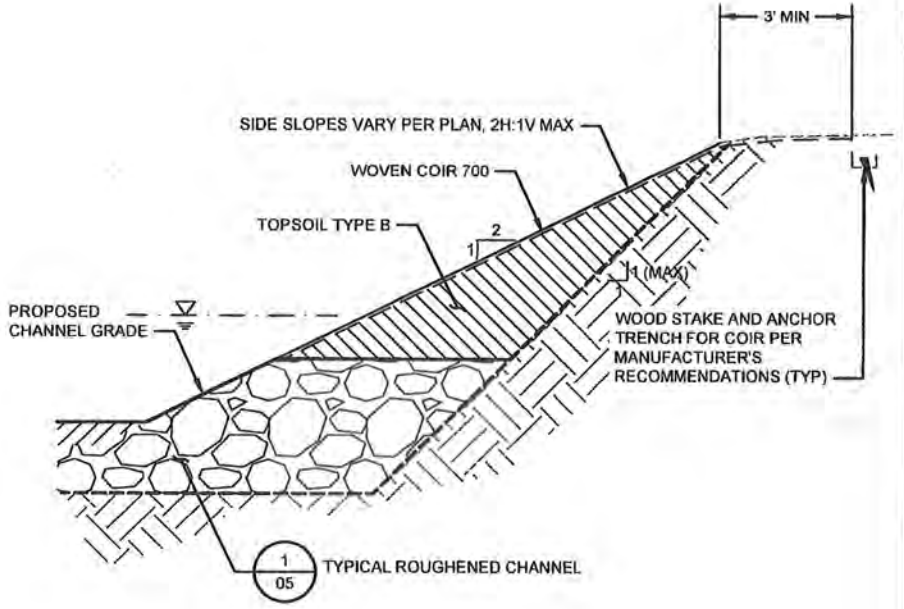
STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 05 OF: 14 DATE: NOVEMBER 2018



DETAIL - TYPICAL TERRACED BANK RESTORATION FOR STEEP SLOPES 1/05

SCALE: NTS



DETAIL - TYPICAL BANK RESTORATION FOR SHALLOW SLOPES 2/05

SCALE: NTS

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BANK RESTORATION DETAILS

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stuləgʷaʔbš VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

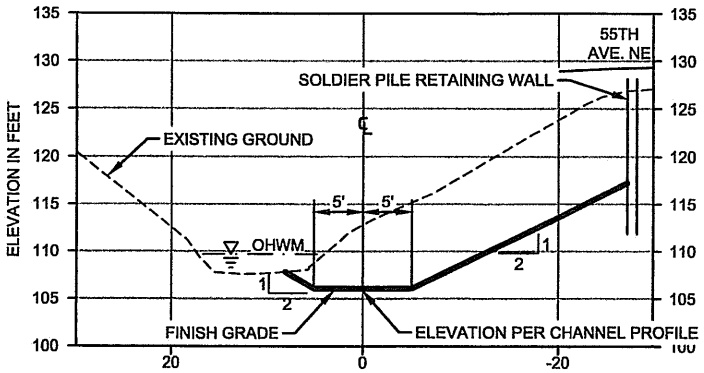
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FIGURE 06

STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 06 OF: 14 DATE: NOVEMBER 2018

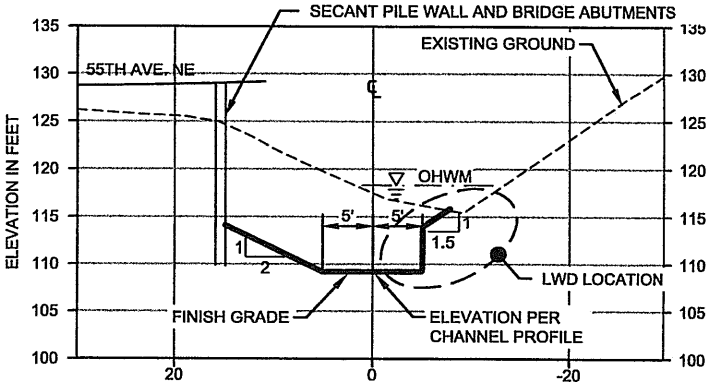


SECTION - KACKMAN CREEK CHANNEL (A / 04)

SCALE: 1" = 20'

NOTES:

1. LOCATION: STA. 15+33, LOOKING DOWNSTREAM.

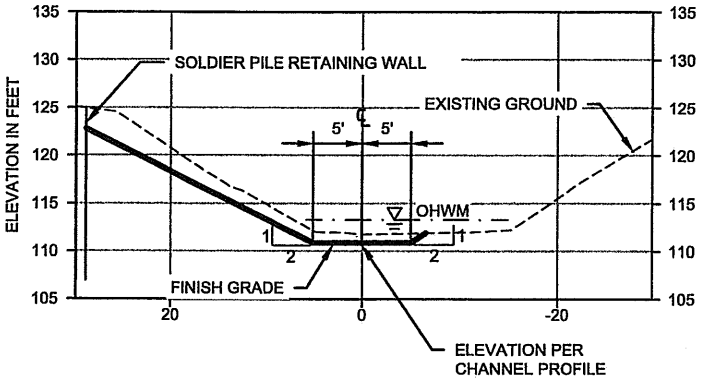


SECTION - KACKMAN CREEK CHANNEL (B / 04)

SCALE: 1" = 20'

NOTES:

1. LOCATION: STA. 16+11, LOOKING DOWNSTREAM.

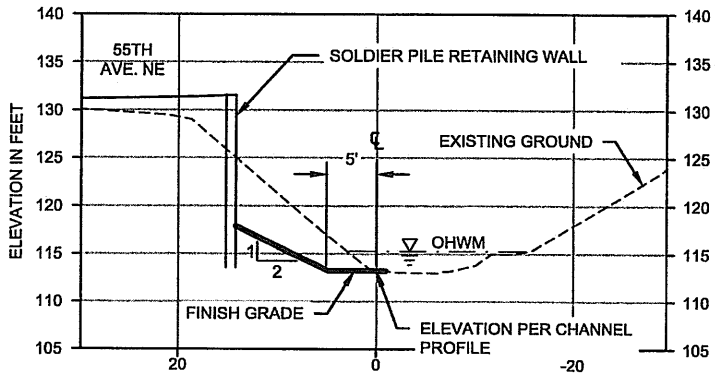


SECTION - KACKMAN CREEK CHANNEL (C / 04)

SCALE: 1" = 20'

NOTES:

1. LOCATION: STA. 16+53, LOOKING DOWNSTREAM.



SECTION - KACKMAN CREEK CHANNEL (D / 04)

SCALE: 1" = 20'

NOTES:

1. LOCATION: STA. 17+25, LOOKING DOWNSTREAM
2. GRADE SLOPE FROM TOE OF SLOPE AT BENCH.

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CHANNEL CROSS SECTIONS

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stuləgʷaʔbš VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

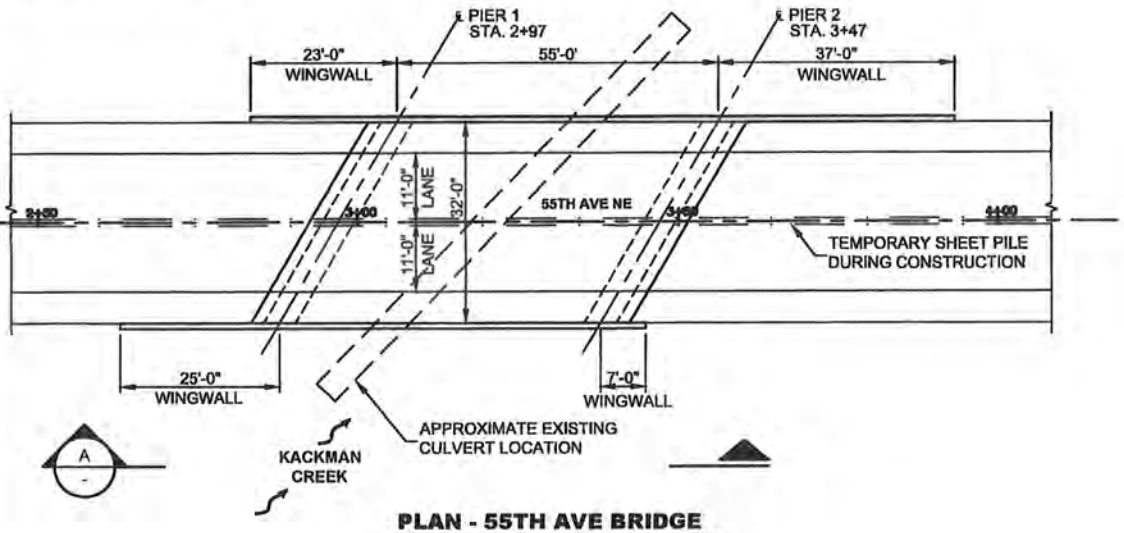
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FIGURE 07

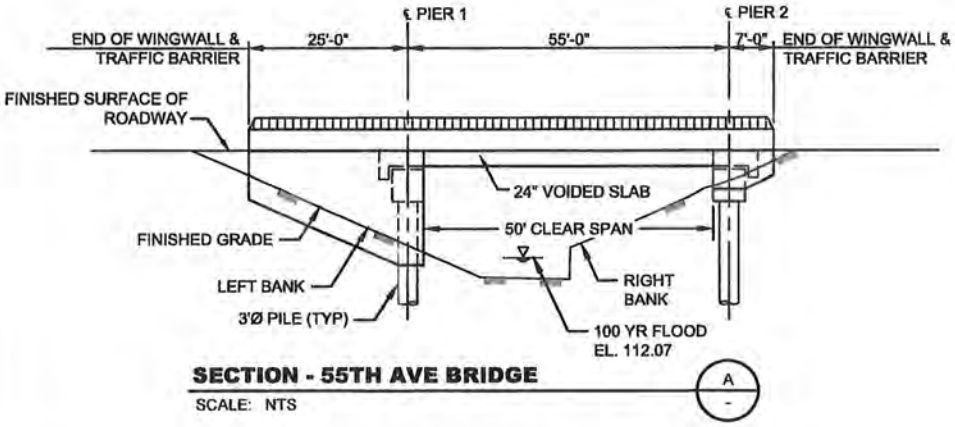
STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 07 OF: 14
DATE: NOVEMBER 2018



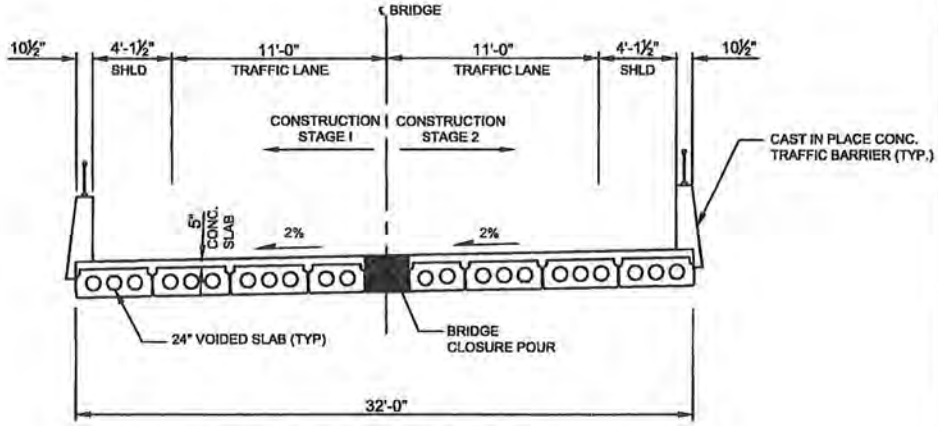
PLAN - 55TH AVE BRIDGE

SCALE: NTS



SECTION - 55TH AVE BRIDGE

SCALE: NTS



DETAIL - 55TH AVE BRIDGE (LOOKING SOUTH)

SCALE: NTS

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BRIDGE PROFILE AND SECTION

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stuləgʷaʔbš VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

(360) 652-7362

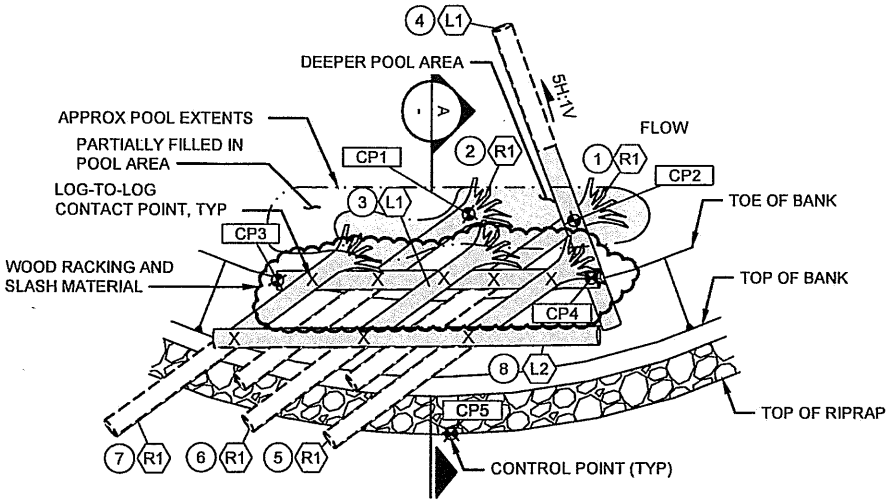
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FIGURE 08

STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

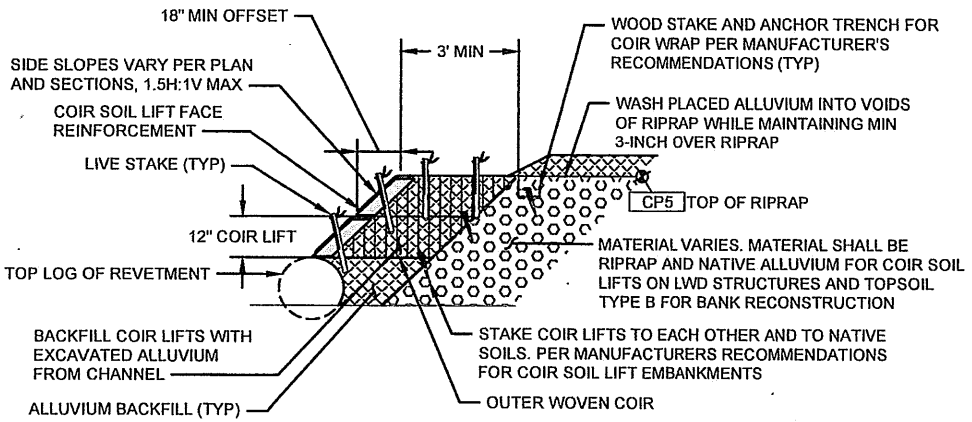
REFERENCE NO: -

SHEET: 08 OF: 14 DATE: NOVEMBER 2018



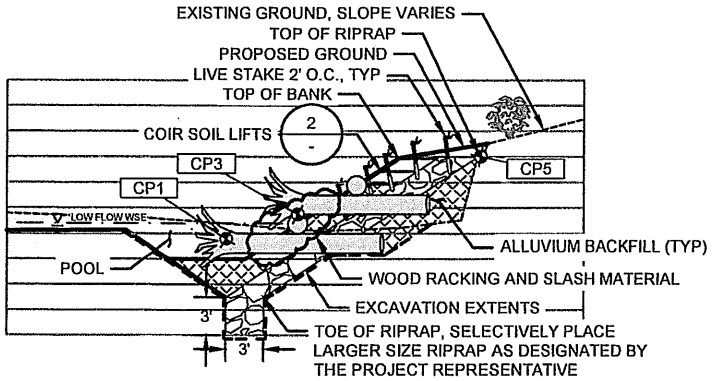
DETAIL - BANK LOG STRUCTURE (1)

SCALE: NTS



DETAIL - TYPICAL COIR SOIL LIFT EMBANKMENT (2)

SCALE: NTS



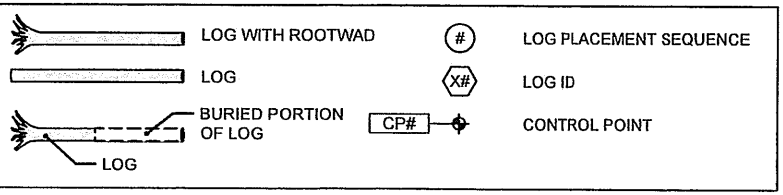
SECTION - BANK LOG STRUCTURE (A)

SCALE: NTS

LOG SCHEDULE - BANK LOG STRUCTURE:

LOG TYPE	MIN DIA (IN)	LENGTH (FT)	ROOTWAD (YES/NO)	TOTAL QTY PER STRUCTURE
R1	18	20	YES	5
L1	18	25	NO	2
L2	18	30	NO	1

LEGEND:



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BANK LOG STRUCTURE DETAILS

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stulǝgʷaʼbš VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

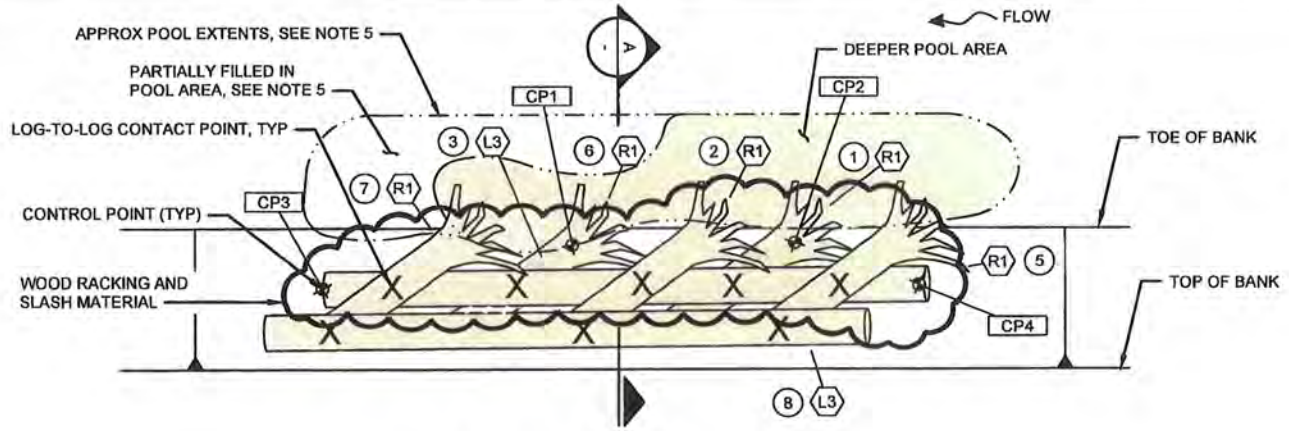
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FIGURE 09

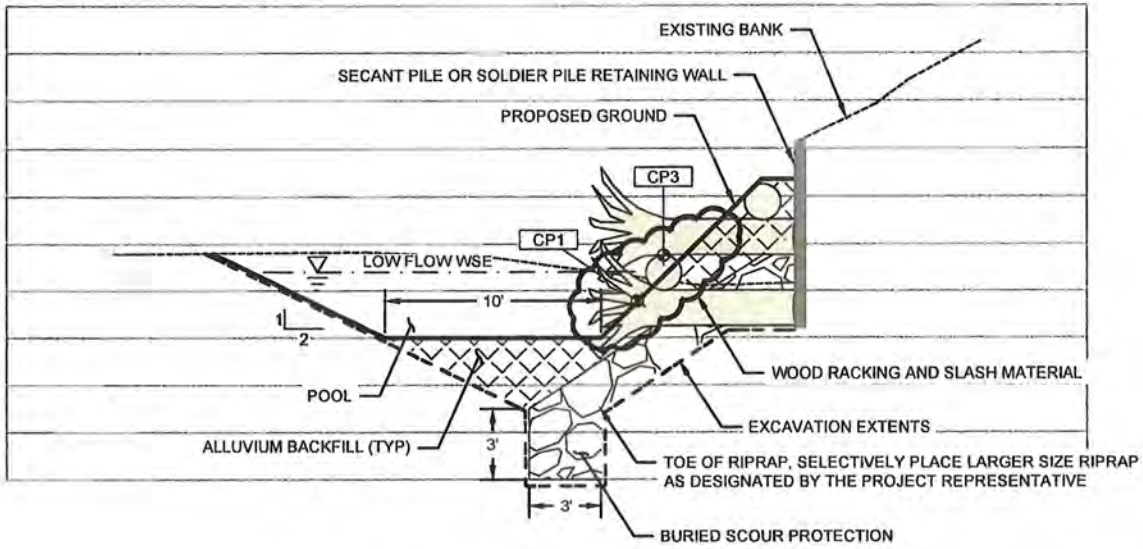
STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 09 OF: 14 DATE: NOVEMBER 2018



DETAIL - LOG REVETMENT (1 / -)

SCALE: NTS



SECTION - LOG REVETMENT (A / -)

SCALE: NTS

LOG REVETMENT NOTES:

1. STRUCTURE LOCATION AND LOG ORIENTATION AND DEPTH SHOWN IS APPROXIMATE AND WILL VARY FOR EACH STRUCTURE BASED ON SITE SPECIFIC CONDITIONS. PRIOR TO CONSTRUCTION CONTRACTOR SHALL FLAG STRUCTURE CONTROL POINT LOCATION. THE PROJECT REPRESENTATIVE SHALL THEN MAKE ANY NECESSARY FIELD ADJUSTMENTS TO LOG LOCATIONS, ORIENTATIONS AND DEPTHS. CONTRACTOR SHALL VERIFY FINAL STRUCTURE LOCATION AND EXCAVATION EXTENTS WITH PROJECT REPRESENTATIVE PRIOR TO CONSTRUCTION.
2. LOGS SHALL BE PLACED AT THE LOCATIONS, ELEVATIONS, DEPTHS AND ORIENTATIONS SPECIFIED ON THE DRAWINGS OR AS DESIGNATED BY THE PROJECT REPRESENTATIVE. TRIM LOGS AS NEEDED TO BUTT UP TO RETAINING WALL.
3. CONTRACTOR SHALL BACKFILL ALL EXCAVATIONS USING RIPRAP AND EXCAVATED ALLUVIUM AS SHOWN.

LOG SCHEDULE - LOG REVETMENT:

LOG TYPE	MIN DIA (IN)	LENGTH (FT)	ROOTWAD (YES/NO)	TOTAL QTY PER STRUCTURE
R1	18	9	YES	5
L3	18	25	NO	3

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LOG REVETMENT DETAILS

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

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ARLINGTON, WA 98223

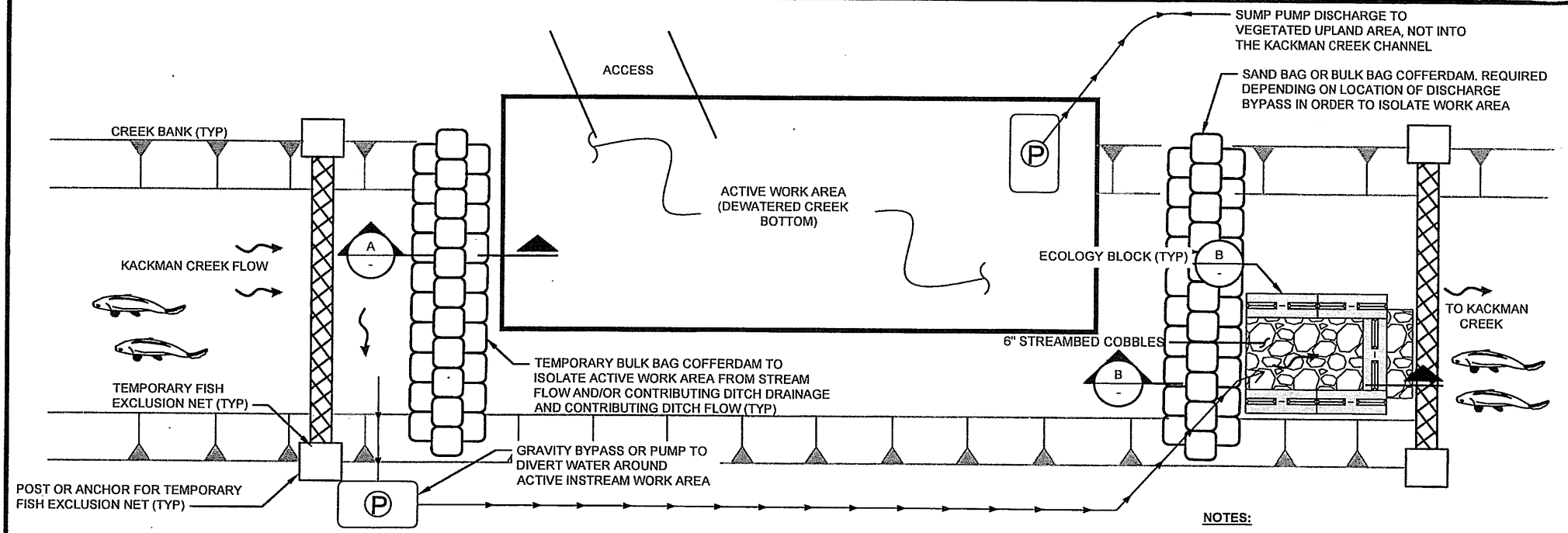
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FIGURE 10

STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 10 OF: 14 DATE: NOVEMBER 2018

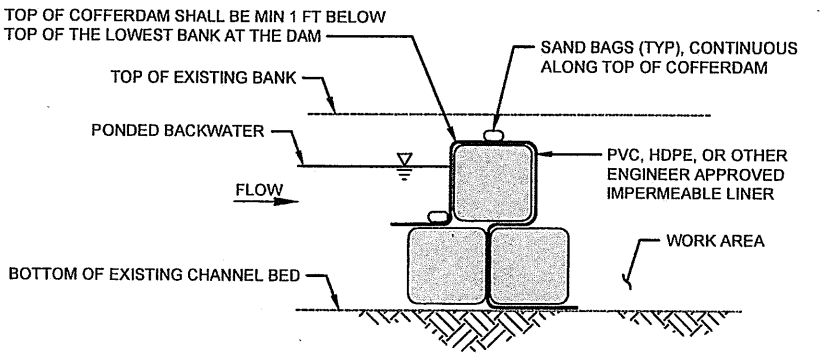


DETAIL - FLOW BYPASS AND FISH EXCLUSION SCHEMATIC (1)

SCALE: NTS

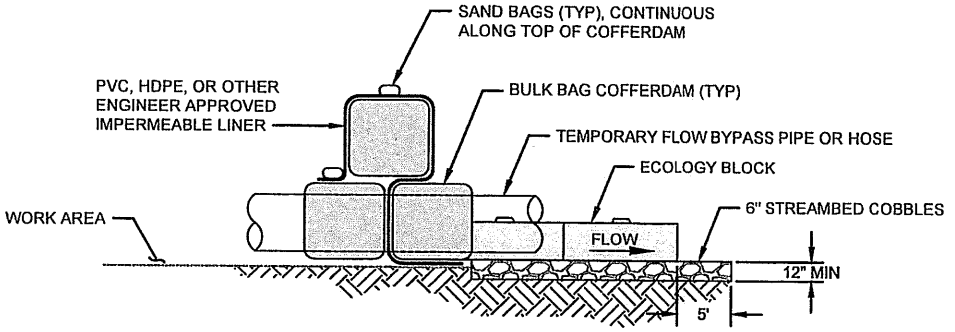
NOTES:

1. EXISTING CULVERT WILL BE FLOW BYPASS UNTIL SECANT PILE WALL IS CONSTRUCTED.



SECTION - FLOW BYPASS UPSTREAM (EAST) (A)

SCALE: NTS



SECTION - FLOW BYPASS DOWNSTREAM (WEST) (B)

SCALE: NTS

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FLOW BYPASS DETAILS

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stuləgʷaʔbš VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

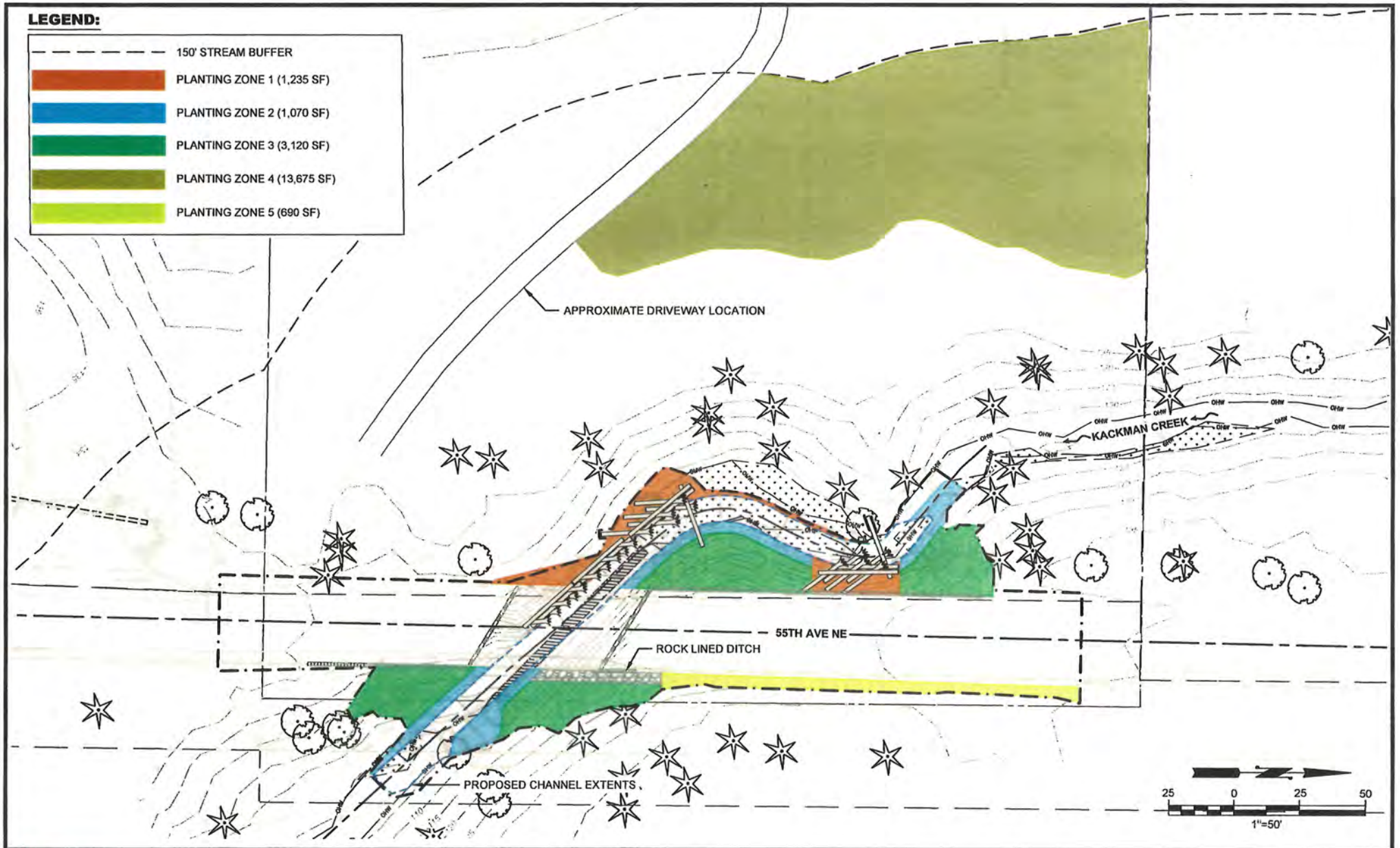
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FIGURE 11

STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 11 OF: 14
DATE: NOVEMBER 2018



HERRERA PREPARED BY HERRERA ENVIRONMENTAL CONSULTANTS DATE OF PRINT: 11/7/2018 1:17 PM - BY: ERIC MARSHALL - FILE LOCATION: O:\proj\Y2015\15-06057-005\CAD\Dwg\Kackman JARPA\Planting plans.dwg

PLANTING PLAN

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH
stulǝgʷa'bš
VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

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FIGURE 12

STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

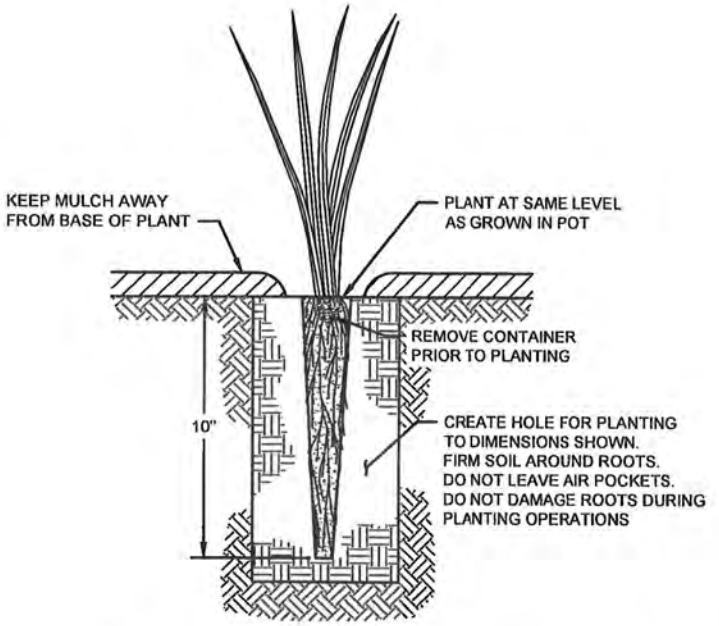
REFERENCE NO: -
SHEET: 12 OF: 14 DATE: NOVEMBER 2018

PLANT SCHEDULE:

Scientific Name	Common Name	Stock Type	O.C. Spacing	Planting Zone				Total Quantity
				P-1	P-2	P-3	P-4	
Trees								
Acer macrophyllum	Bigleaf maple	1 gal deep root pot	15			13	23	36
Pseudotsuga menziesii	Douglas-fir	1 gal deep root pot	15			7	23	30
Thuja plicata	Western red cedar	1 gal deep root pot	15			2	23	25
Shrubs								
Acer circinatum	Vine maple	1 gal deep root pot	4			30	100	130
Mahonia aquifolium	Tall Oregon grape	1 gal deep root pot	4				215	215
Physocarpus capitatus	Pacific ninebark	1 gal deep root pot	4	15		35		50
Rubus spectabilis	Salmonberry	1 gal deep root pot	4	15		55	200	270
Sambucus racemosa	Red elderberry	1 gal deep root pot	4			25		25
Symphoricarpos albus	Snowberry	1 gal deep root pot	4				215	215
Rosa nutkana	Nootka rose	1 gal deep root pot	4				180	180
Groundcover								
Athyrium felix-femina	Lady fern	10 ci tubeling	2		70			70
Carex obnupta	Slough sedge	4 ci plug	2		70			70
Polystichum munitum	Sword fern	10 ci tubeling	2			180	330	510
Rubus ursinus	Trailing blackberry	10 ci tubeling	2			275	330	605
Scirpus microcarpus	Small-fruited bulrush	4 ci plug	2		70			70
Tellima grandiflora	Fringecup	10 ci tubeling	2			275	330	605
Live Stakes								
Cornus sericea	Redosier dogwood	Live stake	2	69	100			169
Salix scouleriana	Scouler's willow	Live stake	2	69	100			169
Salix sitchensis	Sitka willow	Live stake	2	69	100			169

SEED MIX SCHEDULE:

Scientific Name	Common Name	Planting Zone				
		P-1	P-2	P-3	P-4	P-5
		PLS pounds/acre				
Bromus carinatus	California brome	9.0	0.0	9.0	4.1	7.1
Chamerion angustifolium	Common Fireweed	0.0	0.0	0.0	0.1	0.0
Deschampsia cespitosa	Tufted hairgrass	1.1	0.0	1.1	0.0	0.0
Elymus glaucus	Blue wildrye	8.9	0.0	8.9	2.1	4.0
Festuca rubra	Red fescue	4.3	0.0	4.3	1.3	3.2
Lupinus polyphyllus	Bigleaf lupine	0.0	0.0	0.0	10.0	0.0
Tellima grandiflora	Fringecup	0.0	0.0	0.0	0.0	0.0
Triticum aestivum	Regreen wheatgrass	12.7	0.0	12.7	3.8	7.7
	Grand Total	**36.0**	**0.0**	**36.0**	**21.4**	**22.0**



DETAIL - 10 CUBIC-INCH SEDGE PLUG PLANTING (1)

SCALE: NTS

PLANTING SCHEDULE AND DETAILS

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stuləgʷaʔbš VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

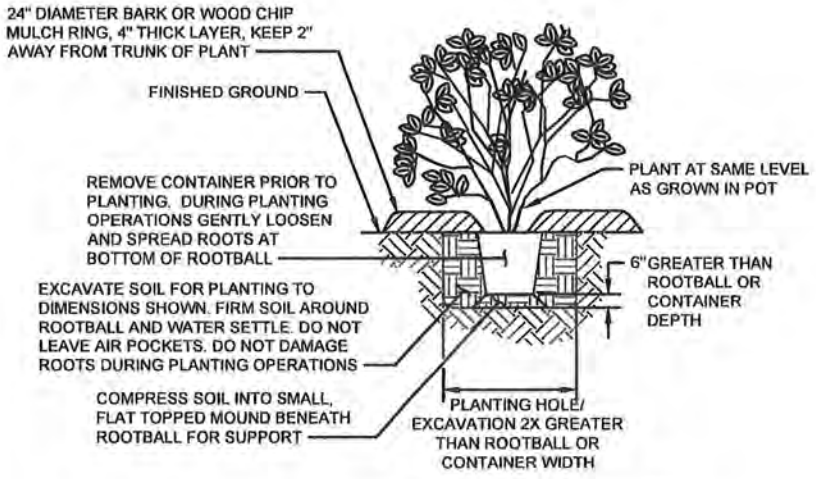
(360) 652-7362

NWS-2018-1142

FIGURE 13

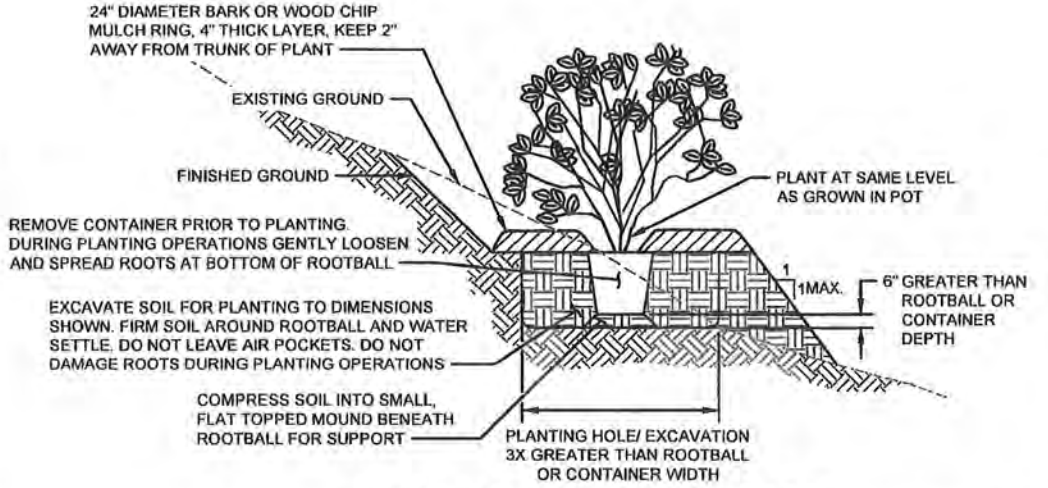
STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 13 OF: 14 DATE: NOVEMBER 2018



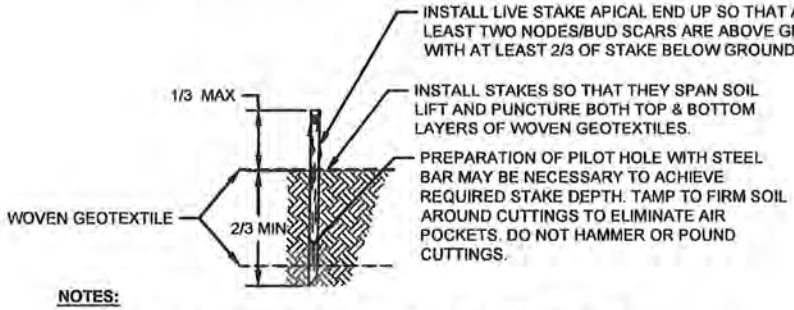
DETAIL - ONE, TWO, AND FIVE GALLON CONTAINER TREE AND SHRUB PLANTING 1

SCALE: NTS



DETAIL - ONE, TWO, AND FIVE GALLON CONTAINER TREE AND SHRUB PLANTING ON SLOPE 2

SCALE: NTS

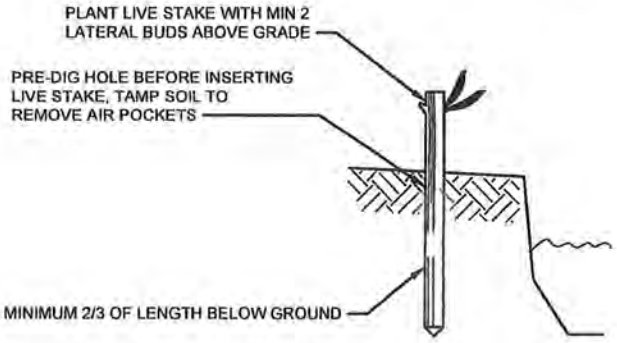


NOTES:

1. SOAK WILLOW STAKES IN WATER FOR 24 HOURS PRIOR TO PLANTING.
2. BASAL END OF LIVE STAKES SHOULD BE 0.5-1.5 INCHES IN DIAMETER AND AT LEAST 36 INCHES IN LENGTH.
3. KEEP LIVE STAKES COVERED, COOL, AND MOIST AT ALL TIMES PRIOR TO PLANTING. AT NO TIME SHOULD LIVE STAKES BE EXPOSED AND ALLOWED TO DRY OUT.
4. WHEN PLANTING ON STREAM BANKS, ANGLE APICAL END OF STAKES SLIGHTLY DOWNSTREAM.

DETAIL - LIVE STAKE PLANTING IN COIR LIFTS 3

SCALE: NTS



NOTES:

1. PLANT STAKE MUST COME INTO CONTACT WITH GROUNDWATER.

DETAIL - LIVE STAKE PLANTING 4

SCALE: NTS

HERRERA PREPARED BY HERRERA ENVIRONMENTAL CONSULTANTS DATE OF PRINT: 11/7/2018 1:16 PM - BY: ERIC MARSHALL - FILE LOCATION: O:\proj\Y2015\15-06057-005\CAD\Dwg\Kackman JARPA\Planting details.dwg

PLANTING DETAILS

LAT/LONG: 48.219N/-122.1577W
VERTICAL DATUM: NAVD 88

PROPOSED PROJECT: KACKMAN CREEK BRIDGE PROJECT AT 55TH AVENUE NE

APPLICANT:

STILLAGUAMISH stulǝgʷaʾbš VILLAGE

STILLAGUAMISH TRIBE OF INDIANS
3322 236TH ST NE
ARLINGTON, WA 98223

(360) 652-7362

NWS-2018-1142

FIGURE 14

STATE: WASHINGTON
COUNTY: SNOHOMISH
CITY: NEAR ARLINGTON, WA
LOCATION: 55TH AVENUE NE
WATERBODY: KACKMAN CREEK

REFERENCE NO: -
SHEET: 14 OF: 14 DATE: NOVEMBER 2018

US Army Corps of Engineers
Seattle District

NATIONWIDE PERMIT 29
Terms and Conditions

Effective Date: March 19, 2017

A. Description of Authorized Activities
B. U.S. Army Corps of Engineers (Corps) National General Conditions for all NWPs
C. Corps Seattle District Regional General Conditions
D. Corps Regional Specific Conditions for this NWP
E. Washington Department of Ecology (Ecology) Section 401 Water Quality Certification (401 Certification): General Conditions
F. Ecology 401 Certification: Specific Conditions for this NWP
G. Coastal Zone Management Consistency Response for this NWP

In addition to any special condition that may be required on a case-by-case basis by the District Engineer, the following terms and conditions must be met, as applicable, for a Nationwide Permit (NWP) authorization to be valid in Washington State.

A. DESCRIPTION OF AUTHORIZED ACTIVITIES

29. Residential Developments. Discharges of dredged or fill material into non-tidal waters of the United States for the construction or expansion of a single residence, a multiple unit residential development, or a residential subdivision. This NWP authorizes the construction of building foundations and building pads and attendant features that are necessary for the use of the residence or residential development. Attendant features may include but are not limited to roads, parking lots, garages, yards, utility lines, storm water management facilities, septic fields, and recreation facilities such as playgrounds, playing fields, and golf courses (provided the golf course is an integral part of the residential development).

The discharge must not cause the loss of greater than 1/2-acre of non-tidal waters of the United States. The discharge must not cause the loss of more than 300 linear feet of stream bed, unless for intermittent and ephemeral stream beds the district engineer waives the 300 linear foot limit by making a written determination concluding that the discharge will result in no more than minimal adverse environmental effects. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters. The loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre.

Subdivisions: For residential subdivisions, the aggregate total loss of waters of United States authorized by this NWP cannot exceed 1/2-acre. This includes any loss of waters of the United States associated with development of individual subdivision lots.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity. (See general condition 32.) (Authorities: Sections 10 and 404)

B. CORPS NATIONAL GENERAL CONDITIONS FOR ALL NWPs

To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every

NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition,

capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. (b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status. (c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are

those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur. (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. (d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs. (e) Authorization of an activity by an NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. (f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required. (g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The

permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. (b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. (d) For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. (e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If

circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment. (a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal: (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site). (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal. (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. (d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)). (e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required

riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses. (f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation. (2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)). (3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation. (4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). (5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided. (6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs. (h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties

responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management. (i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: “When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

_____

(Transferee)

_____

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include: (a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions; (b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and (c) The signature of the permittee certifying the completion of the activity and mitigation. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained.

Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals. (d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal. (2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes. (3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.
(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

District Engineer's Decision: 1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project

proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the individual crossings of waters of the United States to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51, 52, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects. For those NWPs that have a waivable 300 linear foot limit for losses of intermittent and ephemeral stream bed and a 1/2-acre limit (i.e., NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52), the loss of intermittent and ephemeral stream bed, plus any other losses of jurisdictional waters and wetlands, cannot exceed 1/2-acre. 2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns. 3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters (e.g., streams). The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer. 4. If the district engineer determines that the adverse

environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31, or to evaluate PCNs for activities authorized by NWPs 21, 49, and 50), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

Further Information: 1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP. 2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law. 3. NWPs do not grant any property rights or exclusive privileges. 4. NWPs do not authorize any injury to the property or rights of others. 5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

C. CORPS SEATTLE DISTRICT REGIONAL GENERAL CONDITIONS: The following conditions apply to all NWPs for the Seattle District in Washington State, unless specified.

1. Project Drawings: Drawings must be submitted with pre-construction notification (PCN). Drawings must provide a clear understanding of the proposed project, and how waters of the U.S. will be affected. Drawings must be originals and not reduced copies of large-scale plans. Engineering drawings are not required. Existing and proposed site conditions (manmade and landscape features) must be drawn to scale.

2. Aquatic Resources Requiring Special Protection: Activities resulting in a loss of waters of the United States in mature forested wetlands, bogs and peatlands, aspen-dominated wetlands, alkali wetlands, vernal pools, camas prairie wetlands, estuarine wetlands, wetlands in coastal lagoons, and wetlands in dunal systems along the Washington coast cannot be authorized by a NWP, except by the following NWPs:

NWP 3 – Maintenance
NWP 20 – Response Operations for Oil and Hazardous Substances
NWP 32 – Completed Enforcement Actions
NWP 38 – Cleanup of Hazardous and Toxic Waste

In order to use one of the above-referenced NWPs in any of the aquatic resources requiring special protection, prospective permittees must submit a PCN to the Corps of Engineers (see NWP general condition 32) and obtain written authorization before commencing work.

3. New Bank Stabilization in Tidal Waters of Puget Sound: Activities involving new bank stabilization in tidal waters in Water Resource Inventory Areas (WRIAs) 8, 9, 10, 11 and 12 (within the areas identified on Figures 1a through 1e on Corps website) cannot be authorized by NWP.

4. Commencement Bay: The following NWPs may not be used to authorize activities located in the Commencement Bay Study Area (see Figure 2 on Corps website):

NWP 12 – Utility Line Activities (substations)
NWP 13 – Bank Stabilization
NWP 14 – Linear Transportation Projects
NWP 23 – Approved Categorical Exclusions
NWP 29 – Residential Developments
NWP 39 – Commercial and Institutional Developments
NWP 40 – Agricultural Activities
NWP 41 – Reshaping Existing Drainage Ditches
NWP 42 – Recreational Facilities
NWP 43 – Stormwater and Wastewater Management Facilities

5. Bank Stabilization: All projects including new or maintenance bank stabilization activities require PCN to the Corps of Engineers (see NWP general condition 32). For new bank stabilization projects only, the following must be submitted to the Corps of Engineers:

a. The cause of the erosion and the distance of any existing structures from the area(s) being stabilized.
b. The type and length of existing bank stabilization within 300 feet of the proposed project.
c. A description of current conditions and expected post-project conditions in the waterbody.
d. A statement describing how the project incorporates elements avoiding and minimizing adverse environmental effects to the aquatic environment and nearshore riparian area, including vegetation impacts in the waterbody.

In addition to a. through d., the results from any relevant geotechnical investigations can be submitted with the PCN if it describes current or expected conditions in the waterbody.

6. Crossings of Waters of the United States: Any project including installing, replacing, or modifying crossings of waters of the United States, such as culverts or bridges, requires submittal of a PCN to the Corps of Engineers (see NWP general condition 32). If a culvert is proposed to cross waters of the U.S. where salmonid species are present or could be present, the project must apply the stream simulation design method from the Washington Department of Fish and Wildlife located in the *Water Crossing Design Guidelines* (2013), or a design method which provides passage at all life stages at all flows where the salmonid species would naturally seek passage. If the stream simulation design method is not applied for a culvert where salmonid species are present or could be present, the project proponent must provide a rationale in the PCN sufficient to establish one of the following:

a. The existence of extraordinary site conditions.
b. How the proposed design will provide equivalent or better fish passage and fisheries habitat benefits than the stream simulation design method.

If a culvert is proposed to cross waters of the U.S. where salmonid species are present or could be present, project proponents must provide a monitoring plan with the PCN that specifies how the proposed culvert will be assessed over a five-year period from the time of construction completion to ensure its effectiveness in providing passage at all life stages at all flows where the salmonid species would naturally seek passage. Culverts installed under emergency authorization that do not meet the above design criteria will be required to meet the above design criteria to receive an after-the-fact nationwide permit verification.

7. Stream Loss: A PCN is required for all activities that result in the loss of any linear feet of stream beds. No activity shall result in the loss of any linear feet of perennial stream beds or the loss of greater than 300 linear feet of intermittent and/or ephemeral stream beds. A stream may be rerouted if it is designed in a manner that maintains or restores hydrologic, ecologic, and geomorphic stream processes, provided there is not a reduction in the linear feet of stream bed. Streams include brooks, creeks, rivers, and historical waters of the U.S. that have been channelized into ditches. This condition does not apply to ditches constructed in uplands. Stream loss restrictions may be waived by the district engineer on a case-by-case basis provided the activities result in net increases of aquatic resource functions and services.

8. Mitigation: Pre-construction notification is required for any project that will result in permanent wetland losses that exceed 1,000 square feet. In addition to the requirements of General Condition 23 (Mitigation), compensatory mitigation at a minimum one-to-one ratio will be required for all permanent wetland losses that exceed 1,000 square feet. When a PCN is required for wetland losses less than 1,000 square feet, the Corps of Engineers may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation for impacts to marine waters, lakes, and streams will be determined on a case-by-case basis. If temporary impacts to waters of the U.S. exceed six months, the Corps of Engineers may require compensatory mitigation for temporal effects.

9. Magnuson-Stevens Fishery Conservation and Management Act – Essential Fish Habitat
Essential Fish Habitat (EFH) is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. If EFH may be adversely affected by a proposed activity, the prospective permittee must provide a written EFH assessment with an analysis of the effects of the proposed action on EFH. The assessment must identify the type(s) of essential fish habitat (i.e., Pacific salmon, groundfish, and/or coastal-pelagic species) that may be affected. If the Corps of Engineers determines the project will adversely affect EFH, consultation with NOAA Fisheries will be required. Federal agencies should follow their own procedures for complying with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act. If PCN is required for the proposed activity, Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

10. Forage Fish: For projects in forage fish spawning habitat, in-water work must occur within designated forage fish work windows, or when forage fish are not spawning. If working outside of a designated work window, or if forage fish work windows are closed year round, work may occur if the work window restriction is released for a period of time after a forage fish spawning survey has been conducted by a biologist approved by the Washington State Department of Fish and Wildlife (WDFW). Forage fish species with designated in-water work windows include Pacific sand lance (*Ammodytes hexapterus*), Pacific herring (*Clupea pallasi*), and surf smelt (*Hypomesus pretiosus*). This RGC does not apply to NWP 48, *Commercial Shellfish Aquaculture Activities*. Please see specific regional conditions for NWP 48.

11. Notification of Permit Requirements: The permittee must provide a copy of the nationwide permit authorization letter, conditions, and permit drawings to all contractors and any other parties performing the authorized work prior to the commencement of any work in waters of the U.S. The permittee must ensure all appropriate contractors and any other parties performing the authorized work at the project site have read and understand relevant NWP conditions as well as plans, approvals, and documents referenced in the NWP letter. A copy of these documents must be maintained onsite throughout the duration of construction.

12. Construction Boundaries: Permittees must clearly mark all construction area boundaries before beginning work on projects that involve grading or placement of fill. Boundary markers and/or construction fencing must be maintained and clearly visible for the duration of construction. Permittees should avoid and minimize removal of native vegetation (including submerged aquatic vegetation) to the maximum extent possible.

13. Temporary Impacts and Site Restoration
a. Temporary impacts to waters of the U.S. must not exceed six months unless the prospective permittee requests and receives a waiver by the district engineer. Temporary impacts to waters of the U.S. must be identified in the PCN.

b. No more than 1/2 acre of waters of the U.S. may be temporarily filled unless the prospective permittee requests and receives a waiver from the district engineer (temporary fills do not affect specified limits for loss of waters associated with specific nationwide permits).
c. Native soils removed from waters of the U.S. for project construction should be stockpiled and used for site restoration. Restoration of temporarily disturbed areas must include returning the area to pre-project ground surface contours. If native soil is not available from the project site for restoration, suitable clean soil of the same textural class may be used. Other soils may be used only if identified in the PCN.
d. The permittee must revegetate disturbed areas with native plant species sufficient in number, spacing, and diversity to restore affected functions. A maintenance and monitoring plan commensurate with the impacts, may be required. Revegetation must begin as soon as site conditions allow within the same growing season as the disturbance unless the schedule is approved by the Corps of Engineers. Native plants removed from waters of the U.S. for project construction should be stockpiled and used for revegetation when feasible. Temporary Erosion and Sediment Control measures must be removed as soon as the area has established vegetation sufficient to control erosion and sediment.
e. If the Corps determines the project will result in temporary impacts of submerged aquatic vegetation (SAV) that are more than minimal, a monitoring plan must be submitted. If recovery is not achieved by the end of the monitoring period, contingencies must be implemented, and additional monitoring will be required.

This RGC does not apply to NWP 48, *Commercial Shellfish Aquaculture Activities*. Please see specific regional conditions for NWP 48.

D. CORPS REGIONAL SPECIFIC CONDITIONS FOR THIS NWP:

1. Pre-construction notification must identify if the project is an individual lot within a subdivision or part of a multiphase development.

2. Private residential driveways in waters of the U.S. with footprints wider than 22 feet or longer than 200 feet are not authorized by this NWP. For this requirement, "footprint" refers to the bottom width of the roadway fill prism.

E. ECOLOGY 401 CERTIFICATION: GENERAL CONDITIONS

In addition to all the Corps National and Seattle Districts' Regional permit conditions, the following State General Section 401 Water Quality Certification (Section 401) conditions apply to all Nationwide Permits whether **certified** or **partially certified** in the State of Washington.

1. **For in-water construction activities**. Ecology Section 401 review is required for projects or activities authorized under NWPs that will cause, or may be likely to cause or contribute to an exceedance of a State water quality standard (Chapter 173-201A WAC) or sediment management standard (Chapter 173-204 WAC). State water quality standards and sediment management standards are available on Ecology's website. Note: In-water activities include any activity within a wetland and/or activities below the ordinary high water mark (OHWM).

2. **Projects or Activities Discharging to Impaired Waters**. Ecology Section 401 review is required for projects or activities authorized under NWPs if the project or activity will occur in a 303(d) listed segment of a waterbody or upstream of a listed segment and may result in further exceedances of the specific listed parameter. To determine if your project or activity is in a 303(d) listed segment of a waterbody, visit Ecology's Water Quality Assessment webpage for maps and search tools.

3. **Application**. For projects or activities that will require Ecology Section 401 review, applicants must provide Ecology with a Joint Aquatic Resources Permit Application (JARPA) along with the

documentation provided to the Corps, as described in National General Condition 32, Pre-Construction Notification, including, when applicable: (a) A description of the project, including site plans, project purpose, direct and indirect adverse environmental effects the project would cause, best management practices (BMPs), and any other Department of the Army or federal agency permits used or intended to be used to authorize any part of the proposed project or any related activity. (b) Drawings indicating the Ordinary High Water Mark (OHWM), delineation of special aquatic sites and other waters of the state. Wetland delineations must be prepared in accordance with the current method required by the Corps and shall include Ecology's Wetland Rating form. Wetland rating forms are subject to review and verification by Ecology staff. Guidance for determining the OHWM is available on Ecology's website. (c) A statement describing how the mitigation requirement will be satisfied. A conceptual or detailed mitigation or restoration plan may be submitted. See State General Condition 5 for details on mitigation requirements. (d) Other applicable requirements of Corps Nationwide Permit General Condition 32, Corps Regional Conditions, or notification conditions of the applicable NWP. (e) Within 180 calendar days from receipt of applicable documents noted above **and** a copy of the final authorization letter from the Corps providing coverage for a proposed project or activity under the NWP Program Ecology will provide the applicant notice of whether an individual Section 401 will be required for the project. If Ecology fails to act within a year after receipt of **both** of these documents, Section 401 is presumed waived.

4. **Aquatic resources requiring special protection**. Certain aquatic resources are unique, difficult-to-replace components of the aquatic environment in Washington State. Activities that would affect these resources must be avoided to the greatest extent possible. Compensating for adverse impacts to high value aquatic resources is typically difficult, prohibitively expensive, and may not be possible in some landscape settings. Ecology Section 401 review is required for activities in or affecting the following aquatic resources (and not prohibited by Seattle District Regional General Condition): (a) Wetlands with special characteristics (as defined in the Washington State Wetland Rating Systems for western and eastern Washington, Ecology Publications #14-06-029 and #14-06-030):

- Estuarine wetlands.
- Wetlands of High Conservation Value.
- Bogs.
- Old-growth and mature forested wetlands.
- Wetlands in coastal lagoons.
- Interdunal wetlands.
- Vernal pools.
- Alkali wetlands.

(b) Fens, aspen-dominated wetlands, camas prairie wetlands. (c) Marine water with eelgrass (*Zostera marina*) beds (except for NWP 48). (d) Category I wetlands. (e) Category II wetlands with a habitat score ≥ 8 points. This State General Condition does not apply to the following Nationwide Permits:
NWP 20 – *Response Operations for Oil and Hazardous Substances,* NWP 32 – *Completed Enforcement Actions*

5. Mitigation. Applicants are required to show that they have followed the mitigation sequence and have first avoided and minimized impacts to aquatic resources wherever practicable. For projects requiring Ecology Section 401 review with unavoidable impacts to aquatics resources, adequate compensatory mitigation must be provided.

(a) Wetland mitigation plans submitted for Ecology review and approval shall be based on the most current guidance provided in Wetland Mitigation in Washington State, Parts 1 and 2 (available on Ecology's website) and shall, at a minimum, include the following:

i. A description of the measures taken to avoid and minimize impacts to wetlands and other waters of the U.S.
ii. The nature of the proposed impacts (i.e., acreage of wetlands and functions lost or degraded).
iii. The rationale for the mitigation site that was selected.

iv. The goals and objectives of the compensatory mitigation project.

v. How the mitigation project will be accomplished, including construction sequencing, best management practices to protect water quality, proposed performance standards for measuring success and the proposed buffer widths.

vi. How it will be maintained and monitored to assess progress towards goals and objectives. Monitoring will generally be required for a minimum of five years. For forested and scrub-shrub wetlands, 10 years of monitoring will often be necessary.

vii. How the compensatory mitigation site will be legally protected for the long term.

Refer to Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans (Ecology Publication #06-06-011b) and Selecting Wetland Mitigation Sites Using a Watershed Approach (Ecology Publications #09-06-032 (Western Washington) and #10-06-007 (Eastern Washington)) for guidance on selecting suitable mitigation sites and developing mitigation plans. Ecology encourages the use of alternative mitigation approaches, including credit/debit methodology, advance mitigation, and other programmatic approach such as mitigation banks and in-lieu fee programs. If you are interested in proposing use of an alternative mitigation approach, consult with the appropriate Ecology regional staff person. Information on alternative mitigation approaches is available on Ecology's website.

(b) Mitigation for other aquatic resource impacts will be determined on a case-by-case basis.

6. Temporary Fills. Ecology Section 401 review is required for any project or activity with temporary fill in wetlands or other waters of the state for more than 90 days, unless the applicant has received written approval from Ecology. Note: This State General Condition does not apply to projects or activities authorized under NWP 33, *Temporary Construction, Access, and Dewatering*

7. Stormwater pollution prevention: All projects that involve land disturbance or impervious surfaces must implement stormwater pollution prevention or control measures to avoid discharge of pollutants in stormwater runoff to waters of the State.

(a) For land disturbances during construction, the applicant must obtain and implement permits (e.g., Construction Stormwater General Permit) where required and follow Ecology's current stormwater manual.

(b) Following construction, prevention or treatment of on-going stormwater runoff from impervious surfaces shall be provided.

Ecology's Stormwater Management and Design Manuals and stormwater permit information are available on Ecology's website.

8. State Section 401 Review for PCNs not receiving 45-day response from the Seattle District. In the event the Seattle District Corps does not issue a NWP authorization letter within 45 calendar days of receipt of a **complete** pre-construction notification, the applicant must contact Ecology for Section 401 review prior to commencing work.

F. ECOLOGY 401 CERTIFICATION: SPECIFIC CONDITIONS FOR THIS NWP:

Certified subject to conditions. Ecology Section 401 review is required for projects or activities authorized under this NWP if:

1. The residential development has impacts to waters of the state greater than ¼ acre.
2. The project is a subdivision. (NOTE: "Subdivision" is the division or redivision of land into lots, tracts, parcels, sites, or divisions for the purpose of sale, lease, or transfer of ownership.)

G. COASTAL ZONE MANAGEMENT CONSISTENCY RESPONSE FOR THIS NWP:
(Note: This is only applies in the following counties: Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Wahkiakum and Whatcom)

Response: Ecology concurs that this NWP is consistent with the CZMP, subject to the following condition: An individual Coastal Zone Management Consistency Determination is required for project or activities under this NWP if State Section 401 review is required.

General Conditions: For Non-Federal Permittees
1. Necessary Data and Information. A Coastal Zone Management Program "Certification of Consistency" form is required for projects located within a coastal county. "Certification of Consistency" forms are available on Ecology's website. The form shall include a description of the proposed project or activity and evidence of compliance with the applicable enforceable policies of the Washington Coastal Zone Management Program (CZMP). Also, a map of the site location is required.
2. Timing. Within 6 months from receipt of the necessary data and information, Ecology will provide a federal consistency determination for the proposed project or activity. If Ecology fails to act within the 6 month period, concurrence with the CZMP is presumed.

General Conditions: For Federal Permittees (Agencies)
1. Necessary Data and Information. Federal agencies shall submit the determination, information, and analysis required by 15 CFR 930.39 to obtain a federal consistency determination.
2. Timing. Within 60 days from receipt of the necessary data and information, Ecology will provide a federal consistency determination for the proposed project or activity. If Ecology fails to act within the 60 day period, concurrence with the CZMP is presumed.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
7600 Sand Point Way
Seattle, WA 98115-6349

Refer to NMFS No:
WCR-2019-11528

March 14, 2019

Michelle Walker
Corps of Engineers, Seattle District
Regulatory Branch CENWS-OD-RG
Post Office Box 3755
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Stillaguamish Tribe Fish Passage Project in Snohomish County, Washington. COE Number: NWS-2018-1142, HUC: 17110008.

Dear Ms. Walker:

This letter responds to your February 20, 2019, request for concurrence from the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA) for the subject action. Your request qualified for our expedited review and concurrence because it met our screening criteria and contained all required information on your proposed action and its potential effects to listed species and designated critical habitat.

We reviewed your consultation request document and related materials. Based on our knowledge, expertise, and the materials you provided, we concur with your conclusions that the proposed action is not likely to adversely affect the NMFS ESA-listed species and/or designated critical habitats identified in your consultation request and supplemental e-mail.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). A complete record of this consultation is on file electronically at the NMFS West Coast Region Oregon-Washington Coast Office.

Reinitiation of consultation is required and shall be requested by the COE, or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this concurrence letter; or if (3) a new species is listed or critical habitat designated that may be affected by the identified action.

NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and concurs with the COE determination that the project will not adversely affect EFH. This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. In this case, NMFS concluded the action would not adversely affect EFH, thus, consultation under the MSA is not required for this action.

Please direct questions regarding this letter to Mike Lisitza at the Oregon-Washington Coastal office at mike.lisitza@noaa.gov or 360-753-4407.

Sincerely,

Elizabeth Babcock

Elizabeth L. Babcock
Branch Chief, North Puget Sound
Oregon Washington Coastal Area Office

cc: Kathyrn Heard, COE

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

MAR 0 4 2019

In Reply Refer To:
01EWFW00-2019-I-0556

Michelle Walker, Chief Regulatory Branch
Seattle District, U.S. Army Corps of Engineers
ATTN: Katie Heard
P.O. Box 3755
Seattle, Washington 98124-3755

Dear Ms. Walker:

Subject: Stillaguamish Tribe of Indians, Kackman Creek Culvert Replacement (NWS-2018-1142)

This letter is in response to your February 11, 2019, request for our concurrence with your determination that the proposed action located in Kackman Creek, near Arlington, Snohomish County, Washington, "may affect, but is not likely to adversely affect" federally listed species. We received your letter, Biological Evaluation, and plan sheets and figures, providing information in support of your determinations, on February 19, 2019. A copy of your transmittal document(s) describing the proposed action is enclosed.

Specifically, you requested informal consultation pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA) for the federally listed species and critical habitat identified below.

- Bull trout (*Salvelinus confluentus*)

The U.S. Army Corps of Engineers and Applicant have determined that the action will have "no effect" on additional listed species and critical habitat that are known to occur in Snohomish County. The U.S. Fish and Wildlife Service (Service) has no regulatory or statutory authority for concurring with "no effect" determinations, and no consultation with the Service is required. Your determinations that the action will have no effect on these listed species and critical habitat rest with the federal action agency. We recommend that the federal action agency document their analyses and maintain that documentation as part of their project file.

We believe that sufficient information has been provided to determine the effects of the proposed action and to conclude whether it would adversely affect federally listed species and/or designated critical habitat. Our concurrence is based on information provided by the federal action agency, best available science, and complete and successful implementation of agreed-upon conservation measures.

EFFECTS TO BULL TROUT

Effects and Disturbance

Temporary and/or long-term effects from the action will not measurably disrupt normal bull trout behaviors (i.e., the ability to successfully feed, move, and/or shelter), and are therefore considered insignificant and/or discountable:

- The action is located in a minor tributary to the Stillaguamish River where, at present, bull trout occurrence is rare or unlikely.
- The action is short in duration and will occur during a time of year (July 1 to August 31) when few, if any, bull trout are present in the action area.
- The action will result in temporary impacts to water quality, including potential temporary increases in turbidity. These effects will be intermittent and limited in physical extent and duration.
- The action includes pile driving or activities that will result in elevated sound pressure levels. However, because of the construction methods and location (i.e., above the ordinary high water mark and outside the wetted perimeter), effects are unlikely to result in injury to bull trout or to disrupt normal bull trout behaviors.
- The action includes conservation measures to prevent entrainment or stranding of fish. We do not expect any capture or handling of bull trout.
- The proposed action will correct a fish passage barrier and construct an improved roughened stream channel with bioengineered bank stabilization and habitat features. The action will provide long-term benefits for bull trout and their prey.

Effects to Bull Trout Habitat and Prey

With successful implementation of the agreed-upon conservation measures, we expect that temporary impacts will not measurably degrade or diminish habitat functions or prey resources in the action area, and effects are therefore considered insignificant and/or discountable:

- Construction methods and proposed permanent features may impact habitat that supports bull trout and/or their prey. These impacts will be limited in physical extent and/or duration, and will not measurably degrade habitat functions, including prey resources, that are important to bull trout within the action area:

- The action will result in limited temporary and/or permanent impacts to native substrates, aquatic vegetation, the benthic invertebrate community, and the complexity of instream habitat. However, the action includes conservation measures, and/or a restoration component, which at least partially offset the action's unavoidable impacts to bull trout habitat and/or prey resources.
- The action includes replacing or repairing bank armoring and will have unavoidable direct and indirect effects to natural stream channel processes that maintain instream habitat. However, the constructed roughened stream channel will include bioengineered bank stabilization and habitat features, and will provide long-term benefits for bull trout and their prey.
- The action will have temporary impacts to wetlands and wetland and riparian buffers. However, these impacts will be temporary and, with restoration of the affected areas, water quality and other wetland and riparian functions will be maintained.
- The action includes operations that will produce and/or discharge stormwater to waterbodies that support bull trout. However, little or no additional stormwater discharge is likely to result from the action, and no associated measurable effects to bull trout or their prey are foreseeable.
- The action will measurably and substantially improve instream habitat functions, providing significant benefits to bull trout and their prey. Foreseeable temporary and short-term impacts will be limited in physical extent, intensity, and duration, and will not prevent bull trout from successfully foraging and migrating in the action area. Long-term effects to bull trout habitat are considered beneficial.

CONCLUSION

This concludes consultation pursuant to the regulations implementing the ESA (50 CFR 402.13). Our review and concurrence with your effect determinations is based on implementation of the project as described. It is the responsibility of the federal action agency to ensure that the projects they authorize or carry out are in compliance with the regulatory permit and ESA. If a permittee or the federal action agency deviates from the measures outlined in a permit or project description, the federal action agency has the obligation to reinitiate consultation and comply with section 7(d).

This project should be re-analyzed and re-initiation may be necessary if 1) new information reveals effects of the action that may affect listed species or critical habitat in a manner, or to an extent, not considered in this consultation, 2) if the action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this consultation, and/or 3) a new species is listed or critical habitat is designated that may be affected by this project.

This letter and its enclosure(s) constitute a complete response by the Service to your request for informal consultation. A record of this consultation is on file at the Washington Fish and Wildlife Office, in Lacey, Washington. If you have any questions about this letter or our shared responsibilities under the ESA, please contact the consulting biologist identified below.

U.S. Fish and Wildlife Service Consultation Biologist(s):
Ryan McReynolds (360-753-6047)

Sincerely,

Tim Romanski

for Brad Thompson, Acting State Supervisor
Washington Fish and Wildlife Office

Enclosure(s)

5. Description of Work

The Stillaguamish Tribe of Indians (Tribe) proposes to replace a failing 48-inch culvert, which conveys Kackman Creek under 55th Avenue Northeast, with a new bridge. The existing culvert has caused structural, hydraulic and geomorphic concerns at the road crossing, and the 55th Avenue Northeast road prism is geotechnically unstable. The culvert and associated downstream grade control (a series of three log weirs) also create a barrier to fish passage. The project is in Snohomish County between Interstate 5 (I-5) and State Route 9, north of the Stillaguamish River (Figure 1).

The Kackman Creek Bridge Project at 55th Avenue Northeast (project) must be completed with staged construction to maintain at least one open lane of traffic along 55th Avenue Northeast during construction. Project designers determined that the most feasible method of staged bridge construction is to utilize closely spaced, drilled shafts (secant piles) as bridge abutments. To construct the bridge in halves (two stages; one lane in each direction), it will be necessary to install temporary shoring parallel to the roadway centerline. The bridge will restore fish passage upstream of 55th Avenue Northeast through a roughened stream channel design. The stream alignment upstream of the crossing will also be shifted to minimize wetland impacts, and the roadway profile will be slightly adjusted to tie in to the new bridge. The roadway and bridge will be supported by retaining walls that will stabilize the road prism and prevent future embankment erosion.

The existing culvert restricts sediment transport. In combination with higher-than-normal peak flows associated with development in the upper basin, the altered sediment regime has contributed to significant geomorphic changes and profile adjustments within the stream. To address the existing condition and remove the fish passage barrier, the design gradient for the stream channel through the proposed 55th Avenue Northeast bridge is slightly steeper than historical conditions, and a roughened channel design based on the hydraulic design method is proposed to ensure a stable, fish-passable streambed.

The 50-foot clear span of the new bridge was determined using the Washington Department of Fish and Wildlife (WDFW) stream simulation design recommendations for fish passage at crossings (WDFW 2013). The failing weirs downstream of the culvert will be removed because they are not functioning and act as fish barriers; their functionality will be replaced by the roughened channel. Log revetments incorporating large woody debris for fish habitat complexity will be installed along the bank to stabilize the road embankment and minimize lateral migration of the stream. Photographs of the road, culvert, and weirs are found in Appendix A.

New Bridge Construction and Culvert Removal

The 55th Avenue Northeast culvert will be replaced with a bridge that will be constructed in stages so traffic can pass through project area during construction. The exact construction sequencing of the bridge will be determined by the contractor. The following describes a likely sequencing scenario. Before the in-water work window, a secant pile wall and pile cap will be installed outside the ordinary high water mark (OHWM) and below the existing roadway grade. The steps for secant pile wall construction include using a vibratory-hammer to drive a casing into the ground, then using an auger to cut and remove soil within the casing to create a borehole. Concrete is then poured into the borehole to create the primary bored piles. Secondary boreholes are then installed between the primary boreholes, and steel cages are placed by a crane to reinforce the structure within the secondary boreholes before the concrete is poured into the secondary boreholes. This process will be repeated until the entire length of the secant pile wall is completed. Next, a soldier-pile retaining wall will be installed on the northbound lane side, and the road prism will be excavated down to the culvert, which will allow for installation of bridge girders and the bridge deck on the northbound lane. Traffic will then be switched to the northbound lane, and this construction sequence will be repeated for the southbound lane. Construction of the bridge components will not occur within wetlands or below the OHWM of Kackman Creek.

Excavated material will be stockpiled on site for use as backfill. Excess excavated material will be hauled from the project site to a licensed disposal or material reuse facility.

Retaining Wall (upland)/Piling

Once the secant pile walls have been constructed, soldier pile retaining walls will be installed on the west side of the road, north of the proposed bridge on the west side; they will also be installed on the east side of the road, south of the bridge. Using retaining walls to stabilize the road prism will help avoid impacts on Kackman Creek and wetlands. The soldier pile walls will be constructed using a pile-driving, impact hammer to install H-piles, with lagging installed between the H-piles. Native soils will be excavated with track-mounted excavators to make room for lagging installation. Excavated soils will be stockpiled either within the 55th Avenue Northeast right-of-way or nearby on Stillaguamish tribal land before being placed as backfill behind the retaining wall. Installation of the H-piles and lagging for the retaining walls will occur outside of wetlands and above the OHWM.

In-Water Work Area Isolation

Stream diversion and fish exclusion materials will be installed during the in-water work window so that the culvert and remaining road prism can be completely removed, and the new stream channel can be constructed. Isolating the in-water work area will require temporary streamflow bypass. Prior to bypass installation, fish will be removed and excluded from the work zone using seine nets, dip nets, and/or electrofishers consistent with state and federal guidelines for fish exclusion and work area isolation (USFWS 2012; WSDOT 2016). Nets will be composed of nylon or a similar non-abrasive material. Next, cofferdams, constructed of sandbags or bulk bags lined with plastic, will be placed at the upstream and downstream limits of the in-water work zone. Streamflow will be piped and pumped around the work zone. Any turbid water within the work zone will be pumped to an upland location for treatment prior to reentering the stream. Water intakes used to pump water around the work zone will have fish screens installed, operated, and maintained according to Washington State screening requirements for water diversions (RCW 77.57.070). All fish removal, fish isolation, and temporary stream flow bypass work will occur during allowable in-water work windows approved by the U.S. Army Corps of Engineers (USACE) and WDFW. The in-water work window is expected to be between July 1 and August 31 (USACE 2017; WDFW 2017b).

It will be necessary to pump groundwater that seeps into the in-water work zone. All pumped groundwater will be discharged to upland areas or to an erosion control best management practice (BMP); it will not be directly discharged to Kackman Creek.

Culvert Removal

Once fill around the culvert has been removed, the culvert will be lifted from under the assembled bridge using a crane. Once removed, the existing culvert material will also be hauled from the project site to a licensed disposal facility.

Channel Modification, Flow Bypass, Fish Exclusion, and Bank Stabilization/Revetments

Tracked excavators will be used to excavate the stream channel down to the proposed grades; to place the boulders, cobbles, and streambed sediment for the roughened channel; to install scour protection rock below the bridge; to construct the bank log structures and log revetments; to regrade and compact bank soils; and to backfill coir lifts along the banks. Salvaged, suitable, excavated, native materials and additional boulders, cobbles, and gravels will be used to create the roughened channel. Excavated materials that are unsuitable for reuse within the project will be disposed of at a licensed disposal facility.

Bank stabilization measures will be required to stabilize the failing 55th Avenue Northeast road embankment. After the retaining walls are installed and embankments are regraded, bank log structures

and log revetment structures will be installed underneath and upstream of the proposed bridge to minimize lateral migration in high erosion risk areas. Wood for the log revetments will be sourced on site using felled Douglas-fir (*Pseudotsuga menziesii*) trees from Stillaguamish tribal land. The log structures will be installed at the OHWM with part of the structures embedded into the stream bank, requiring some excavation of native soils. Areas excavated for log installation will be backfilled with riprap and native excavated alluvium. Wood racking and slash material harvested from the Douglas-fir logs will fill gaps within the exposed portion of the log structures. Logs will be approximately 18 inches in diameter and 15 to 25 feet long and will consist of trunks and root wads.

Other erosion control and bank stabilization measures include placing riprap on banks underneath the bridge and a coir-lift embankment design with native woody and herbaceous plantings on slopes 1.5H:1V and steeper.

Ditch

A temporary construction access route for tracked excavators will be installed east of the northbound lane from 55th Avenue Northeast down to Kackman Creek. Vegetation will be cleared for the construction entrance and the entire access route, the ground will be leveled, and quarry spalls will by placed along the route so that soil compaction and sediment releases will be minimized. Once the construction access from the northeast corner of the crossing to the stream channel is no longer needed, the access area will be restored and a portion of it will be regraded to convey stormwater from the road and bridge in a V-ditch consisting of grass in lower gradient areas and a cobble bed on steeper gradient sections. Stormwater will flow downgradient over grass, then over the cobble bed before discharging into Kackman Creek. The V-ditch will be designed according to Snohomish County drainage requirements and will be 18 inches deep with 2H:1V side slopes. The V-ditch in lower-gradient areas will result in temporary impacts, as the area will be revegetated with native herbaceous vegetation; the higher-gradient portion of the ditch will result in permanent impacts to the stream buffer.

Road

The road was designed according to Snohomish County design standards (Snohomish County 2018). The width of the bridge and roadway approaches to the bridge will be 32 feet. The roadway approaches will taper from the designed 32-foot width to the existing 21.7-foot width of 55th Avenue Northeast. Existing pollutant generating impervious surface (PGIS) within the project limits is approximately 7,115 square feet; bridge and road widening will result in an additional 1,375 square feet of new PGIS.

After bridge installation, the road will be repaved and guardrails will be installed. Gravel road base will be placed and compacted, and asphalt paving machines will lay down new asphalt, which will then be rolled to reconstruct the roadway.

Project Impacts

The project will affect Kackman Creek, associated riverine wetlands, and their buffers. Most impacts will be temporary, resulting from necessary construction details to access the culvert and from stream bank and channel modification elements designed to improve functionality of the riverine system. Additional temporary impacts will result from installation of the streamflow bypass. All areas affected by temporary impacts will be restored once construction is complete.

To accommodate the bridge and provide stable banks, the current stream channel will be widened slightly, resulting in some conversion of wetland area to stream area. Approximately 280 square feet of riparian wetlands above the OHWM and 1,235 square feet of wetlands below the OHWM will be converted to stream channel or be lost to installation of log structures. Upslope of the bank log structure, a portion (90 square feet) of Wetland F will be filled and converted to upland buffer to support the bank log structure. Some buffer area located above the existing culvert will be also converted to stream area. No

US Army Corps of Engineers ®
Seattle District

CERTIFICATE OF COMPLIANCE WITH DEPARTMENT OF THE ARMY PERMIT

Permit Number: NWS-_____

Name of Permittee: _____

Date of Issuance: _____

Upon completion of the activity authorized by this permit, please check the applicable boxes below, date and sign this certification, and return it to the following address:

Department of the Army
U.S. Army Corps of Engineers
Seattle District, Regulatory Branch
Post Office Box 3755
Seattle, Washington 98124-3755

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with the terms and conditions of your authorization, your permit may be subject to suspension, modification, or revocation.

☐	The work authorized by the above-referenced permit has been completed in accordance with the terms and conditions of this permit. Date work complete: _____ ☐ Photographs and as-built drawings of the authorized work (OPTIONAL, unless required as a Special Condition of the permit).

☐	If applicable, the mitigation required (e.g., construction and plantings) in the above-referenced permit has been completed in accordance with the terms and conditions of this permit (not including future monitoring). Date work complete: _____ ☐ N/A ☐ Photographs and as-built drawings of the mitigation (OPTIONAL, unless required as a Special Condition of the permit).

☐	Provide phone number/email for scheduling site visits (must have legal authority to grant property access). Printed Name: _____ Phone Number: _____ Email: _____

Printed Name: _____

Signature: _____

Date: _____

APPENDIX F

Standard Plans



Engineering Design and Development Standards





Snohomish County
Public Works

August 6, 2018

ACCESS POINT TYPES AND SPECIFICATIONS

USE	ROAD CLASSIFICATION	SECTION	STANDARD	STD. DWG	MINIMUM RADII (FT)	MINIMUM WIDTH (FT)	MAXIMUM WIDTH (FT)
RESIDENTIAL		CURB (URBAN)	DROP CURB DRIVEWAY	TABLE 2	N/A (2)	TABLE 3	TABLE 3
		SHOULDER (RURAL)	RESIDENTIAL DRIVEWAY APPROACH:				
			–ASPHALT	SD 2–030	10	TABLE 3	TABLE 3
			–CONCRETE	SD 2–035	10	TABLE 3	TABLE 3
COMMERCIAL OR INDUSTRIAL	ARTERIAL	CURB (URBAN)	DROP CURB DRIVEWAY	TABLE 2	N/A (2)	35	40
		SHOULDER (RURAL)	COMMERCIAL/INDUSTRIAL APPROACH:				
			–ASPHALT	SD 2–040	10	35	40
			–CONCRETE	SD 2–045	10	35	40
	NON–ARTERIAL	CURB (URBAN)	DROP CURB DRIVEWAY	TABLE 2	N/A (2)	25	40
		SHOULDER (RURAL)	COMMERCIAL/INDUSTRIAL APPROACH:				
			–ASPHALT	SD 2–040	10	25	40
			–CONCRETE	SD 2–045	10	25	40

TABLE 2

STD. DWG. NO.	DROP CURB DRIVEWAY TYPE
SD 2–020	TYPE 1 – PLANTER STRIP WITH RAMPED DRIVEWAY
SD 2–022	TYPE 2 – PLANTER STRIP WITH RAMPED SIDEWALK
SD 2–024	TYPE 3 – NO PLANTER STRIP, RAMPED SIDEWALK TYPE 3R – NO PLANTER STRIP, REVERSE SLOPE

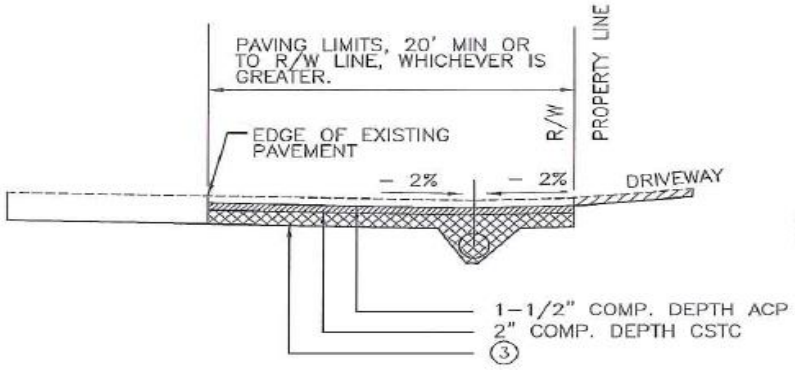
TABLE 3

ROAD NETWORK ELEMENT	MIN. WIDTH (FT) (4)	MAX. WIDTH (FT)
PRIVATE ROAD	20	36
DRIVE AISLE	20	30
ALLEY	16	30
SHARED COURT	20	30
SHARED DRIVEWAY	10	30
DRIVEWAY	10	30

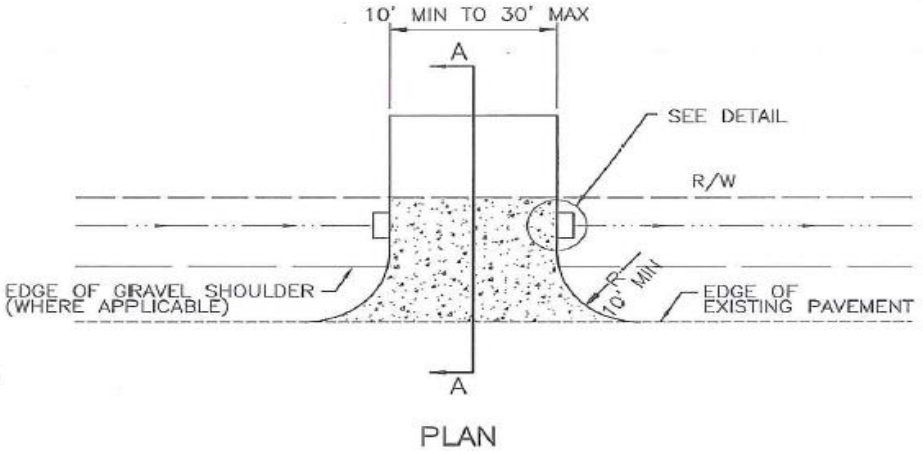
NOTES:

1. TABLE 1 SPECIFICATIONS APPLY TO ALL ROAD NETWORK ELEMENTS EXCEPT PUBLIC ROADS.
2. DROP CURB APPROACHES (TABLE 2) HAVE SIDE RAMPS IN LIEU OF RADII. SIDE RAMPS NOT PART OF A PEDESTRIAN ACCESS ROUTE SHALL NOT EXCEED 10% SLOPE MEASURED PARALLEL TO CURB LINE.
3. SEE EDDS 3–05 FOR ROAD NETWORK ELEMENT DESIGN DETAILS. SEE EDDS 2–03 FOR ONE–WAY ACCESS POINT WIDTHS AND URBAN CENTER ZONE SPECIFICATIONS.
4. FIRE LANE STATUS MAY CHANGE MINIMUM WIDTH, SEE EDDS 2–03.A AND 3–01.C.

SNOHOMISH COUNTY PUBLIC WORKS		APPROVED BY:
2–010	ACCESS POINT TYPES AND SPECIFICATIONS	COUNTY ROAD ENGINEER — DATE 1/7/13



SECTION A–A

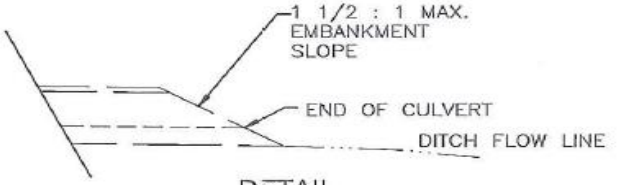


PLAN

NOTES:

1. FOR DRIVEWAY OR SHARED DRIVEWAY ACCESS IN A RURAL SECTION. FIRE LANE SPECIFICATIONS MAY APPLY, SEE EDDS 2–03.A AND 3–01.C.
2. ALL SURFACE DRAINAGE FROM THE DRIVEWAY MUST BE CONTAINED AND DIRECTED FROM THE DRIVEWAY TO THE OPEN DITCH. NO SURFACE DRAINAGE SHALL FLOW ONTO THE COUNTY ROAD.
3. SUBGRADE SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH SECTION 2–03.3(14)C OF THE WSDOT/APWA SPECIFICATIONS (METHOD B). SURFACING MATERIALS SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY (MODIFIED PROCTOR).
4. CULVERT PIPE SHALL BE SIZED TO ACCOMMODATE DITCH FLOWS BUT IN NO CASE BE SMALLER THAN 12 INCHES. BEVEL CULVERT ENDS TO MATCH SIDESLOPES.
5. COVER DEPTHS LESS THAN 12 INCHES REQUIRE APPROVAL BY THE ENGINEER.
6. A DRIVEWAY CULVERT HEADWALL, SUBJECT TO APPROVAL BY THE ENGINEER, MAY BE USED IN LIEU OF THE 1 1/2: 1 MAX. SIDESLOPE.

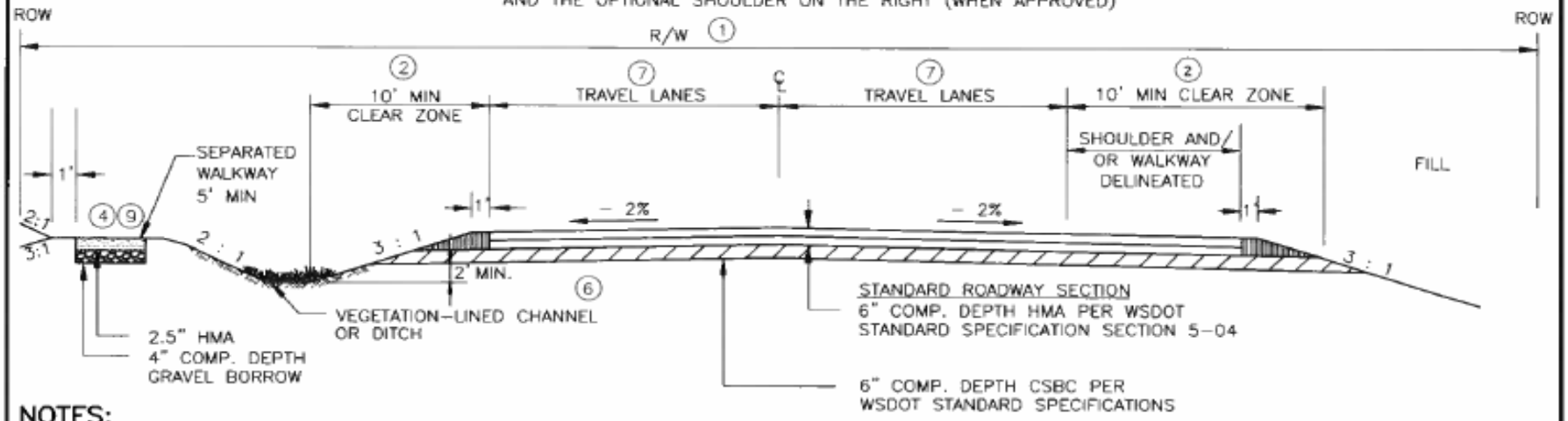
SEE TEXT SECTION 2–03 & 5–05.L



DETAIL

	SNOHOMISH COUNTY PUBLIC WORKS	APPROVED BY:
	2–030 RESIDENTIAL DRIVEWAY APPROACH – ASPHALT	COUNTY ROAD ENGINEER — DATE 1/7/13

FOR ILLUSTRIOUS PURPOSES ONLY THIS DRAWING SHOWS THE REQUIRED SEPARATED WALKWAY ON THE LEFT (REQUIRED BOTH SIDES OF ROAD) AND THE OPTIONAL SHOULDER ON THE RIGHT (WHEN APPROVED)



NOTES:

1. RIGHT OF WAY WIDTH WILL VARY DEPENDING ON LOCATION AND OWNERSHIP OF DRAINAGE AND PEDESTRIAN FACILITIES.
2. CLEAR ZONE DISTANCE FOR ROADS WITH A POSTED SPEED OF 35 MPH OR LESS SHALL BE 10 FT BEYOND EDGE OF TRAVELED WAY. CLEAR ZONE DISTANCES FOR ROADS POSTED AT GREATER THAN 35 MPH SHOULD BE DETERMINED ACCORDING TO CHAPTER 1600 OF THE WSDOT DESIGN MANUAL OR CHAPTER 9 OF THE WSDOT UTILITIES MANUAL, AS APPLICABLE. REFER TO EDDS SECTION 4-15.A(1) FOR MEASURING CLEAR ZONE DISTANCE.
3. CROSS-SECTION MAY BE ALTERED WHERE A STREAM OR WETLAND BORDERS THE ROAD.
4. A WALKWAY IS NOT REQUIRED FOR ACCESS ROADS SERVING 90 ADT OR LESS AND HAVING NO POTENTIAL FOR CONNECTIVITY.
5. IN FILL SECTIONS AND AROUND CUL-DE-SACS, THE ENGINEER MAY REQUIRE A THICKENED EDGE TO CONTROL EROSION. SEE STD. DWG 4-145.
6. SEE STD. DWG. 8-010 FOR PLACEMENT OF UTILITIES.
7. SEE STD. DWG. 3-060 FOR ADDITIONAL SPECIFICATIONS.
8. INDUSTRIAL/COMMERCIAL ROADS SERVING SIGNIFICANT VOLUMES OF TRUCK TRAFFIC MAY REQUIRE ADDITIONAL WIDTH AND PAVEMENT DEPTH AS DETERMINED BY THE ENGINEER BASED ON DATA SUBMITTED BY THE DEVELOPER.
9. PREFERRED WALKWAY LOCATION WHERE R/W PERMITS. WHEN PLACED IN THIS LOCATION, A WIDENED SHOULDER FOR A WALKWAY WILL NOT BE REQUIRED.

SEE TEXT CHAPTER 3

	SNOHOMISH COUNTY PUBLIC WORKS	APPROVED BY: Douglas M. McCormick 8/6/18
	3-040 TYPICAL NON-ARTERIAL ROAD-RURAL AREAS	COUNTY ROAD ENGINEER DATE

GENERAL R/W USE RESTORATION REQUIREMENTS

1. AT THE ENGINEER'S DISCRETION, PRIOR TO COMMENCING ANY CONSTRUCTION, PHOTOGRAPHS DEPICTING PRE-EXISTING ROADWAY CONDITIONS WILL BE REQUIRED EVERY 50 FEET IN PAVED AREAS OR ANY OTHER LOCATION AS SPECIFIED BY THE ENGINEER.

2. SIGNING, FLAGGING AND TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THESE STANDARDS, THE WSDOT TRAFFIC MANUAL AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

3. ONE LANE OF TRAFFIC SHALL REMAIN OPEN AT ALL TIMES, ATTENDED BY FLAGMEN AND APPROPRIATE CONSTRUCTION SIGNING PROVIDED. THE ROAD SHALL BE RESTORED TO TWO-WAY TRAFFIC AT THE END OF EACH WORKING DAY. APPLICATIONS FOR TOTAL ROAD CLOSURES MUST BE FILED WITH SNOHOMISH COUNTY PUBLIC WORKS AT LEAST 5 DAYS PRIOR TO THE ANTICIPATED CLOSURE.

4. EXISTING DRAINAGE DITCHES, CULVERTS, ETC., SHALL BE KEPT CLEAN AT ALL TIMES. TEMPORARY DIVERSION OF ANY DRAINAGE SYSTEM WILL NOT BE PERMITTED WITHOUT THE CONSENT OF THE ENGINEER. ANY DRAINAGE CULVERT, CATCHBASIN, MANHOLE OR OTHER DRAINAGE STRUCTURE DISTURBED BY EXCAVATION SHALL BE REPLACED WITH NEW MATERIAL OR REPAIRED TO THE SATISFACTION OF THE ENGINEER. TEMPORARY EROSION/SEDIMENTATION CONTROL MEASURES SHALL BE EMPLOYED TO PROTECT ADJACENT PROPERTY AND STORM DRAINAGE FACILITIES.

5. GRAVEL SHOULDERS DISTURBED BY EXCAVATION SHALL BE SHAPED TO COUNTY STANDARDS AND PROVIDED WITH A MINIMUM OF 6 INCHES COMPACTED CRUSHED SURFACING TOP COURSE.

6. IF IN THE OPINION OF THE ENGINEER, WEATHER CONDITIONS DETERIORATE TO THE POINT WHERE THE TRAVELED ROADWAYS ARE UNSAFE FOR THE PUBLIC OR DETRIMENTAL TO THE RESTORATION OF THE ROADWAY, EXCAVATION SHALL CEASE IMMEDIATELY AND CLEANUP SHALL BE PROMPTLY ACCOMPLISHED.

7. ALL PIPE OR OTHER MATERIAL STORED ALONG COUNTY RIGHT-OF-WAY MUST BE PLACED AT A SAFE DISTANCE FROM THE TRAVELED ROADWAY IN SUCH A MANNER AS TO AVOID FALLING ONTO THE ROADWAY.

8. NO EXCESS OR UNSUITABLE MATERIAL SHALL BE WASTED ON COUNTY RIGHT-OF-WAY. ANY SUCH MATERIAL DUMPED ON PRIVATE PROPERTY MAY REQUIRE A GRADING PERMIT. VERIFICATION WITH SNOHOMISH COUNTY PLANNING & DEVELOPMENT SERVICES IS REQUIRED.

9. STREET SURFACES SHALL BE CLEANED AT THE END OF EACH DAY'S OPERATION WITH A POWER BROOM OR OTHER APPROVED MEANS.

10. NO OPEN CUT CROSSING OF COUNTY ROADS OR STREETS SHALL BE MADE WITHOUT THE APPROVAL OF THE ENGINEER.

11. MAXIMUM AMOUNT OF OPEN TRENCH IN ROADS SHALL BE 400 LINEAL FEET. AT THE END OF EACH DAY, ALL DITCHES MUST BE BACKFILLED OR COVERED WITH STEEL PLATES AND BARRICADED WITH FLASHING WARNING LIGHTS TO PREVENT PEOPLE OR ANIMALS FROM FALLING INTO THE TRENCH.

12. FINAL CLEANUP INCLUDING COMPLETE RESTORATION OF SHOULDERS, CLEANING OF DITCHES, CULVERTS AND CATCHBASINS, AND REMOVAL OF LOOSE MATERIAL FROM BACK SLOPES OF DITCHES SHALL NOT EXCEED 1500 L.F. BEHIND EXCAVATING OPERATIONS OR AS REQUIRED BY THE ENGINEER.

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	SNOHOMISH COUNTY PUBLIC WORKS	APPROVED BY: Steven E. Thomsen 2-10-03
	8-040 GENERAL R/W RESTORATION REQUIREMENTS	COUNTY ROAD ENGINEER DATE

Stormwater Management Manual for Western Washington













July 2019

DEPARTMENT OF ECOLOGY
State of Washington

Publication Number 19-10-021

BMP C101: Preserving Natural Vegetation

Purpose

The purpose of preserving natural vegetation is to reduce erosion wherever practicable. Limiting site disturbance is the single most effective method for reducing erosion. For example, conifers can hold up to about 50 percent of all rain that falls during a storm. Up to 20-30 percent of this rain may never reach the ground but is taken up by the tree or evaporates. Another benefit is that the rain held in the tree can be released slowly to the ground after the storm.

Conditions of Use

Natural vegetation should be preserved on steep slopes, near perennial and intermittent water-courses or swales, and on building sites in wooded areas.

- As required by local governments.
- Phase construction to preserve natural vegetation on the project site for as long as possible during the construction period.

Design and Installation Specifications

Natural vegetation can be preserved in natural clumps or as individual trees, shrubs and vines.

The preservation of individual plants is more difficult because heavy equipment is generally used to remove unwanted vegetation. The points to remember when attempting to save individual plants are:

- Is the plant worth saving? Consider the location, species, size, age, vigor, and the work involved. Local governments may also have ordinances to save natural vegetation and trees.
- Fence or clearly mark areas around trees that are to be saved. It is preferable to keep ground disturbance away from the trees at least as far out as the dripline.

Plants need protection from three kinds of injuries:

- *Construction Equipment* - This injury can be above or below the ground level. Damage results from scarring, cutting of roots, and compaction of the soil. Placing a fenced buffer zone around plants to be saved prior to construction can prevent construction equipment injuries.
- *Grade Changes* - Changing the natural ground level will alter grades, which affects the plant's ability to obtain the necessary air, water, and minerals. Minor fills usually do not cause problems although sensitivity between species does vary and should be checked. Trees can typically tolerate fill of 6 inches or less. For shrubs and other plants, the fill should be less.

  When there are major changes in grade, it may become necessary to supply air to the roots of plants. This can be done by placing a layer of gravel and a tile system over the roots before the fill is made. The tile system should be laid out on the original grade leading from a dry well

around the tree trunk. The system should then be covered with small stones to allow air to circulate over the root area.

Lowering the natural ground level can seriously damage trees and shrubs. The highest percentage of the plant roots are in the upper 12 inches of the soil and cuts of only 2-3 inches can cause serious injury. To protect the roots it may be necessary to terrace the immediate area around the plants to be saved. If roots are exposed, construction of retaining walls may be needed to keep the soil in place. Plants can also be preserved by leaving them on an undisturbed, gently sloping mound. To increase the chances for survival, it is best to limit grade changes and other soil disturbances to areas outside the dripline of the plant.

- *Excavations* - Protect trees and other plants when excavating for drainfields, power, water, and sewer lines. Where possible, the trenches should be routed around trees and large shrubs. When this is not possible, it is best to tunnel under them. This can be done with hand tools or with power augers. If it is not possible to route the trench around plants to be saved, then the following should be observed:
    - Cut as few roots as possible. When you have to cut, cut clean. Paint cut root ends with a wood dressing like asphalt base paint if roots will be exposed for more than 24-hours.
    - Backfill the trench as soon as possible.
    - Tunnel beneath root systems as close to the center of the main trunk to preserve most of the important feeder roots.

Some problems that can be encountered with a few specific trees are:

- Maple, Dogwood, Red alder, Western hemlock, Western red cedar, and Douglas fir do not readily adjust to changes in environment and special care should be taken to protect these trees.
- The windthrow hazard of Pacific silver fir and madrona is high, while that of Western hemlock is moderate. The danger of windthrow increases where dense stands have been thinned. Other species (unless they are on shallow, wet soils less than 20 inches deep) have a low windthrow hazard.
- Cottonwoods, maples, and willows have water-seeking roots. These can cause trouble in sewer lines and infiltration fields. On the other hand, they thrive in high moisture conditions that other trees would not.
- Thinning operations in pure or mixed stands of Grand fir, Pacific silver fir, Noble fir, Sitka spruce, Western red cedar, Western hemlock, Pacific dogwood, and Red alder can cause serious disease problems. Disease can become established through damaged limbs, trunks, roots, and freshly cut stumps. Diseased and weakened trees are also susceptible to insect attack.

Maintenance Standards

Inspect flagged and/or fenced areas regularly to make sure flagging or fencing has not been removed or damaged. If the flagging or fencing has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

Maintenance Standards

If the fence has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

BMP C105: Stabilized Construction Access

Purpose

Stabilized construction accesses are established to reduce the amount of sediment transported onto paved roads outside the project site by vehicles or equipment. This is done by constructing a stabilized pad of quarry spalls at entrances and exits for project sites.

Conditions of Use

Construction accesses shall be stabilized wherever traffic will be entering or leaving a construction site if paved roads or other paved areas are within 1,000 feet of the site.

For residential subdivision construction sites, provide a stabilized construction access for each residence, rather than only at the main subdivision entrance. Stabilized surfaces shall be of sufficient length/width to provide vehicle access/parking, based on lot size and configuration.

On large commercial, highway, and road projects, the designer should include enough extra materials in the contract to allow for additional stabilized accesses not shown in the initial Construction SWPPP. It is difficult to determine exactly where access to these projects will take place; additional materials will enable the contractor to install them where needed.

Design and Installation Specifications

See Figure II-3.1: Stabilized Construction Access for details. Note: the 100' minimum length of the access shall be reduced to the maximum practicable size when the size or configuration of the site does not allow the full length (100').

Construct stabilized construction accesses with a 12-inch thick pad of 4-inch to 8-inch quarry spalls, a 4-inch course of asphalt treated base (ATB), or use existing pavement. Do not use crushed concrete, cement, or calcium chloride for construction access stabilization because these products raise pH levels in stormwater and concrete discharge to waters of the State is prohibited.

A separation geotextile shall be placed under the spalls to prevent fine sediment from pumping up into the rock pad. The geotextile shall meet the standards listed in Table II-3.2: Stabilized Construction Access Geotextile Standards.

Table II-3.2: Stabilized Construction Access Geotextile Standards

Geotextile Property	Required Value
Grab Tensile Strength (ASTM D4751)	200 psi min.

Table II-3.2: Stabilized Construction Access Geotextile Standards (continued)

Geotextile Property	Required Value
Grab Tensile Elongation (ASTM D4632)	30% max.
Mullen Burst Strength (ASTM D3786-80a)	400 psi min.
AOS (ASTM D4751)	20-45 (U.S. standard sieve size)

- Consider early installation of the first lift of asphalt in areas that will be paved; this can be used as a stabilized access. Also consider the installation of excess concrete as a stabilized access. During large concrete pours, excess concrete is often available for this purpose.
- Fencing (see BMP C103: High-Visibility Fence) shall be installed as necessary to restrict traffic to the construction access.
- Whenever possible, the access shall be constructed on a firm, compacted subgrade. This can substantially increase the effectiveness of the pad and reduce the need for maintenance.
- Construction accesses should avoid crossing existing sidewalks and back of walk drains if at all possible. If a construction access must cross a sidewalk or back of walk drain, the full length of the sidewalk and back of walk drain must be covered and protected from sediment leaving the site.

Alternative Material Specification

WSDOT has raised safety concerns about the Quarry Spall rock specified above. WSDOT observes that the 4-inch to 8-inch rock sizes can become trapped between Dually truck tires, and then released off-site at highway speeds. WSDOT has chosen to use a modified specification for the rock while continuously verifying that the Stabilized Construction Access remains effective. To remain effective, the BMP must prevent sediment from migrating off site. To date, there has been no performance testing to verify operation of this new specification. Jurisdictions may use the alternative specification, but must perform increased off-site inspection if they use, or allow others to use, it.

Stabilized Construction Accesses may use material that meets the requirements of WSDOT's *Standard Specifications for Road, Bridge, and Municipal Construction* Section 9-03.9(1) (WSDOT, 2016) for ballast except for the following special requirements.

The grading and quality requirements are listed in Table II-3.3: Stabilized Construction Access Alternative Material Requirements.

Table II-3.3: Stabilized Construction Access Alternative Material Requirements

Sieve Size	Percent Passing
2½"	99-100

Table II-3.3: Stabilized Construction Access Alternative Material Requirements (continued)

Sieve Size	Percent Passing
2″	65-100
¾″	40-80
No. 4	5 max.
No. 100	0-2
% Fracture	75 min.

- All percentages are by weight.
- The sand equivalent value and dust ratio requirements do not apply.
- The fracture requirement shall be at least one fractured face and will apply the combined aggregate retained on the No. 4 sieve in accordance with FOP for AASHTO T 335.

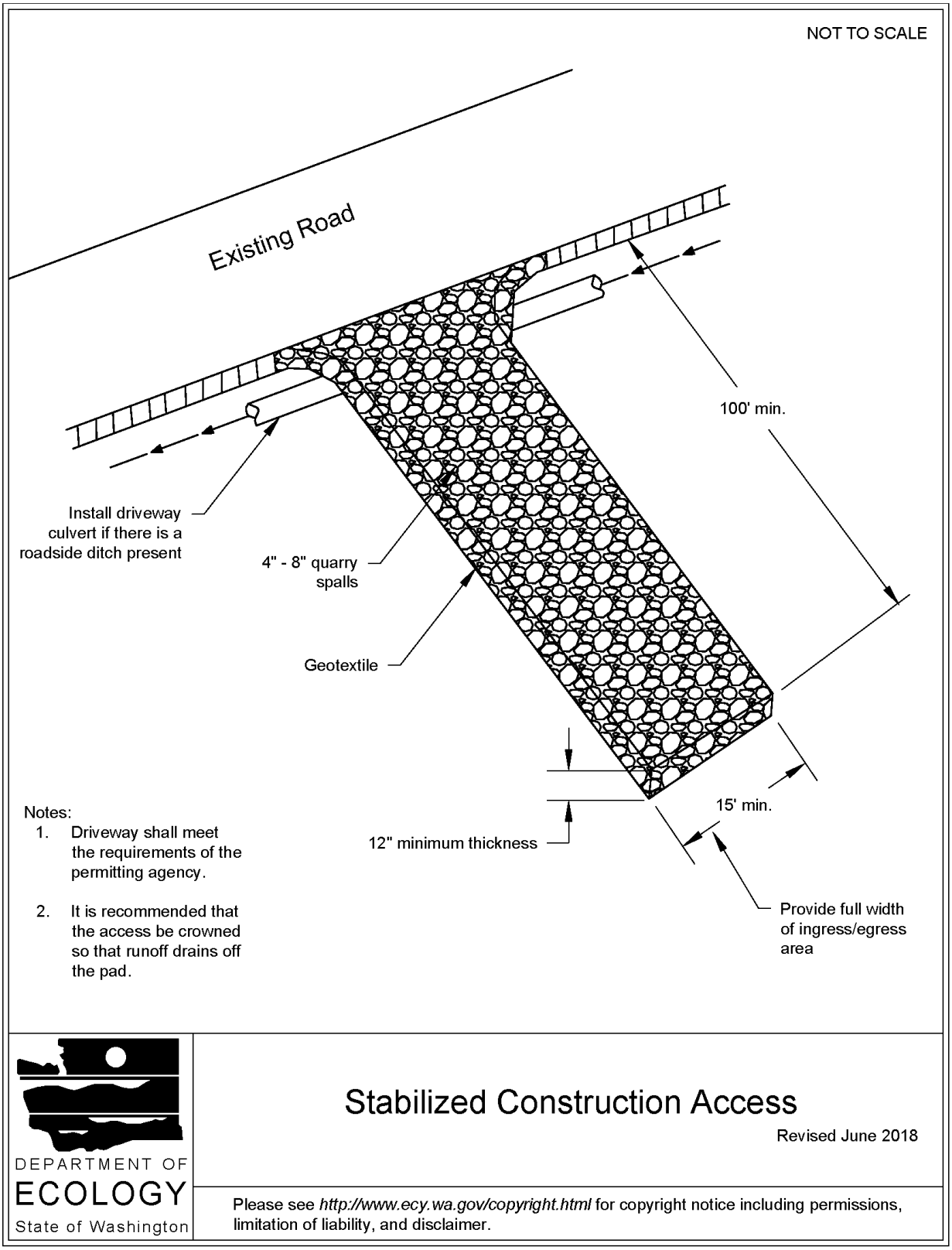
Maintenance Standards

Quarry spalls shall be added if the pad is no longer in accordance with the specifications.

- If the access is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used. This may include replacement/cleaning of the existing quarry spalls, street sweeping, an increase in the dimensions of the access, or the installation of BMP C106: Wheel Wash.
- Any sediment that is tracked onto pavement shall be removed by shoveling or street sweeping. The sediment collected by sweeping shall be removed or stabilized on site. The pavement shall not be cleaned by washing down the street, except when high efficiency sweeping is ineffective and there is a threat to public safety. If it is necessary to wash the streets, the construction of a small sump to contain the wash water shall be considered. The sediment would then be washed into the sump where it can be controlled.
- Perform street sweeping by hand or with a high efficiency sweeper. Do not use a non-high efficiency mechanical sweeper because this creates dust and throws soils into storm systems or conveyance ditches.
- Any quarry spalls that are loosened from the pad, which end up on the roadway shall be removed immediately.
- If vehicles are entering or exiting the site at points other than the construction access(es), BMP C103: High-Visibility Fence shall be installed to control traffic.

- Upon project completion and site stabilization, all construction accesses intended as permanent access for maintenance shall be permanently stabilized.

Figure II-3.1: Stabilized Construction Access



BMP C107: Construction Road / Parking Area Stabilization

Purpose

Stabilizing roads, parking areas, and other on-site vehicle transportation routes immediately after grading reduces erosion caused by construction traffic or stormwater runoff.

Conditions of Use

Roads and parking areas shall be stabilized wherever they are constructed, whether permanent or temporary, for use by construction traffic.

BMP C103: High-Visibility Fence shall be installed, if necessary, to limit the access of vehicles to only those roads and parking areas that are stabilized.

Design and Installation Specifications

- On areas that will receive asphalt as part of the project, install the first lift as soon as possible.
- A 6-inch depth of 2- to 4-inch crushed rock, gravel base, or crushed surfacing base course shall be applied immediately after grading or utility installation. A 4-inch course of asphalt treated base (ATB) may also be used, or the road/parking area may be paved. It may also be possible to use cement or calcium chloride for soil stabilization. If cement or cement kiln dust is used for roadbase stabilization, pH monitoring and BMP C252: Treating and Disposing of High pH Water is necessary to evaluate and minimize the effects on stormwater. If the area will not be used for permanent roads, parking areas, or structures, a 6-inch depth of hog fuel may also be used, but this is likely to require more maintenance. Whenever possible, construction roads and parking areas shall be placed on a firm, compacted subgrade.
- Temporary road gradients shall not exceed 15 percent. Roadways shall be carefully graded to drain. Drainage ditches shall be provided on each side of the roadway in the case of a crowned section, or on one side in the case of a super-elevated section. Drainage ditches shall be directed to a sediment control BMP.
- Rather than relying on ditches, it may also be possible to grade the road so that runoff sheetflows into a heavily vegetated area with a well-developed topsoil. Landscaped areas are not adequate. If this area has at least 50 feet of vegetation that water can flow through, then it is generally preferable to use the vegetation to treat runoff, rather than a sediment pond or trap. The 50 feet shall not include wetlands or their buffers. If runoff is allowed to sheetflow through adjacent vegetated areas, it is vital to design the roadways and parking areas so that no concentrated runoff is created.
- Storm drain inlets shall be protected to prevent sediment-laden water entering the drainage system (see BMP C220: Inlet Protection).

Maintenance Standards

Inspect stabilized areas regularly, especially after large storm events.

Crushed rock, gravel base, etc., shall be added as required to maintain a stable driving surface and to stabilize any areas that have eroded.

Following construction, these areas shall be restored to pre-construction condition or better to prevent future erosion.

Perform street cleaning at the end of each day or more often if necessary.

BMP C120: Temporary and Permanent Seeding

Purpose

Seeding reduces erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion.

Conditions of Use

Use seeding throughout the project on disturbed areas that have reached final grade or that will remain unworked for more than 30 days.

The optimum seeding windows for western Washington are April 1 through June 30 and September 1 through October 1.

Between July 1 and August 30 seeding requires irrigation until 75 percent grass cover is established.

Between October 1 and March 30 seeding requires a cover of mulch or an erosion control blanket until 75 percent grass cover is established.

Review all disturbed areas in late August to early September and complete all seeding by the end of September. Otherwise, vegetation will not establish itself enough to provide more than average protection.

Mulch is required at all times for seeding because it protects seeds from heat, moisture loss, and transport due to runoff. Mulch can be applied on top of the seed or simultaneously by hydroseeding. See BMP C121: Mulching for specifications.

Seed and mulch all disturbed areas not otherwise vegetated at final site stabilization. Final stabilization means the completion of all soil disturbing activities at the site and the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions, or geotextiles) which will prevent erosion. See BMP T5.13: Post-Construction Soil Quality and Depth.

Design and Installation Specifications

General

- Install channels intended for vegetation before starting major earthwork and hydroseed with a Bonded Fiber Matrix. For vegetated channels that will have high flows, install erosion control blankets over the top of hydroseed. Before allowing water to flow in vegetated channels, establish 75 percent vegetation cover. If vegetated channels cannot be established by seed

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Following construction, these areas shall be restored to pre-construction condition or better to prevent future erosion.

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Design and Installation Specifications

General

- Install channels intended for vegetation before starting major earthwork and hydroseed with a Bonded Fiber Matrix. For vegetated channels that will have high flows, install erosion control blankets over the top of hydroseed. Before allowing water to flow in vegetated channels, establish 75 percent vegetation cover. If vegetated channels cannot be established by seed

before water flow; install sod in the channel bottom — over top of hydromulch and erosion control blankets.

- Confirm the installation of all required surface water control measures to prevent seed from washing away.
- Hydroseed applications shall include a minimum of 1,500 pounds per acre of mulch with 3 percent tackifier. See BMP C121: Mulching for specifications.
- Areas that will have seeding only and not landscaping may need compost or meal-based mulch included in the hydroseed in order to establish vegetation. Re-install native topsoil on the disturbed soil surface before application. See BMP T5.13: Post-Construction Soil Quality and Depth.
- When installing seed via hydroseeding operations, only about 1/3 of the seed actually ends up in contact with the soil surface. This reduces the ability to establish a good stand of grass quickly. To overcome this, consider increasing seed quantities by up to 50 percent.
- Enhance vegetation establishment by dividing the hydromulch operation into two phases:
    - Phase 1- Install all seed and fertilizer with 25-30 percent mulch and tackifier onto soil in the first lift.
    - Phase 2- Install the rest of the mulch and tackifier over the first lift.

  Or, enhance vegetation by:
    - Installing the mulch, seed, fertilizer, and tackifier in one lift.
    - Spread or blow straw over the top of the hydromulch at a rate of 800-1000 pounds per acre.
    - Hold straw in place with a standard tackifier.

  Both of these approaches will increase cost moderately but will greatly improve and enhance vegetative establishment. The increased cost may be offset by the reduced need for:
    - Irrigation.
    - Reapplication of mulch.
    - Repair of failed slope surfaces.

  This technique works with standard hydromulch (1,500 pounds per acre minimum) and Bonded Fiber Matrix/ Mechanically Bonded Fiber Matrix (BFM/MBFMs) (3,000 pounds per acre minimum).
- Seed may be installed by hand if:
    - Temporary and covered by straw, mulch, or topsoil.
    - Permanent in small areas (usually less than 1 acre) and covered with mulch, topsoil, or erosion blankets.
- The seed mixes listed in Table II-3.4: Temporary and Permanent Seed Mixes include

recommended mixes for both temporary and permanent seeding.

- Apply these mixes, with the exception of the wet area seed mix, at a rate of 120 pounds per acre. This rate can be reduced if soil amendments or slow-release fertilizers are used. Apply the wet area seed mix at a rate of 60 pounds per acre.
- Consult the local suppliers or the local conservation district for their recommendations. The appropriate mix depends on a variety of factors, including location, exposure, soil type, slope, and expected foot traffic. Alternative seed mixes approved by the local authority may be used, depending on the soil type and hydrology of the area.

Table II-3.4: Temporary and Permanent Seed Mixes

Common Name	Latin Name	% Weight	% Purity	% Germination
Temporary Erosion Control Seed Mix A standard mix for areas requiring a temporary vegetative cover.				
Chewings or annual blue grass	*Festuca rubra var. commutata* or *Poa anna*	40	98	90
Perennial rye	*Lolium perenne*	50	98	90
Redtop or colonial bentgrass	*Agrostis alba* or *Agrostis tenuis*	5	92	85
White dutch clover	*Trifolium repens*	5	98	90
Landscaping Seed Mix A recommended mix for landscaping seed.				
Perennial rye blend	*Lolium perenne*	70	98	90
Chewings and red fescue blend	*Festuca rubra var. commutata* or *Festuca rubra*	30	98	90
Low-Growing Turf Seed Mix A turf seed mix for dry situations where there is no need for watering. This mix requires very little maintenance.				
Dwarf tall fescue (several varieties)	*Festuca arundinacea var.*	45	98	90
Dwarf perennial rye (Barclay)	*Lolium perenne var. barclay*	30	98	90
Red fescue	*Festuca rubra*	20	98	90
Colonial bentgrass	*Agrostis tenuis*	5	98	90
Bioswale Seed Mix A seed mix for bioswales and other intermittently wet areas.				
Tall or meadow fes-	*Festuca arundin-*	75-80	98	90

Table II-3.4: Temporary and Permanent Seed Mixes (continued)

Common Name	Latin Name	% Weight	% Purity	% Germination
cue	*acea* or *Festuca elatior*			
Seaside/Creeping bentgrass	*Agrostis palustris*	10-15	92	85
Redtop bentgrass	*Agrostis alba* or *Agrostis gigantea*	5-10	90	80
Wet Area Seed Mix A low-growing, relatively non-invasive seed mix appropriate for very wet areas that are not regulated wetlands. Consult Hydraulic Permit Authority (HPA) for seed mixes if applicable.				
Tall or meadow fescue	*Festuca arundinacea* or *Festuca elatior*	60-70	98	90
Seaside/Creeping bentgrass	*Agrostis palustris*	10-15	98	85
Meadow foxtail	*Alepocurus pratensis*	10-15	90	80
Alsike clover	*Trifolium hybridum*	1-6	98	90
Redtop bentgrass	*Agrostis alba*	1-6	92	85
Meadow Seed Mix A recommended meadow seed mix for infrequently maintained areas or non-maintained areas where colonization by native plants is desirable. Likely applications include rural road and utility right-of-way. Seeding should take place in September or very early October in order to obtain adequate establishment prior to the winter months. Consider the appropriateness of clover, a fairly invasive species, in the mix. Amending the soil can reduce the need for clover.				
Redtop or Oregon bentgrass	*Agrostis alba* or *Agrostis oregonensis*	20	92	85
Red fescue	*Festuca rubra*	70	98	90
White dutch clover	*Trifolium repens*	10	98	90

Roughening and Rototilling

- The seedbed should be firm and rough. Roughen all soil no matter what the slope. Track walk slopes before seeding if engineering purposes require compaction. Backblading or smoothing of slopes greater than 4H:1V is not allowed if they are to be seeded.
- Restoration-based landscape practices require deeper incorporation than that provided by a simple single-pass rototilling treatment. Wherever practical, initially rip the subgrade to improve long-term permeability, infiltration, and water inflow qualities. At a minimum,

permanent areas shall use soil amendments to achieve organic matter and permeability performance defined in engineered soil/landscape systems. For systems that are deeper than 8 inches complete the rototilling process in multiple lifts, or prepare the engineered soil system per specifications and place to achieve the specified depth.

Fertilizers

- Conducting soil tests to determine the exact type and quantity of fertilizer is recommended. This will prevent the over-application of fertilizer.
- Organic matter is the most appropriate form of fertilizer because it provides nutrients (including nitrogen, phosphorus, and potassium) in the least water-soluble form.
- In general, use 10-4-6 N-P-K (nitrogen-phosphorus-potassium) fertilizer at a rate of 90 pounds per acre. Always use slow-release fertilizers because they are more efficient and have fewer environmental impacts. Do not add fertilizer to the hydromulch machine, or agitate, more than 20 minutes before use. Too much agitation destroys the slow-release coating.
- There are numerous products available that take the place of chemical fertilizers. These include several with seaweed extracts that are beneficial to soil microbes and organisms. If 100 percent cottonseed meal is used as the mulch in hydroseed, chemical fertilizer may not be necessary. Cottonseed meal provides a good source of long-term, slow-release, available nitrogen.

Bonded Fiber Matrix and Mechanically Bonded Fiber Matrix

- On steep slopes use Bonded Fiber Matrix (BFM) or Mechanically Bonded Fiber Matrix (MBFM) products. Apply BFM/MBFM products at a minimum rate of 3,000 pounds per acre with approximately 10 percent tackifier. Achieve a minimum of 95 percent soil coverage during application. Numerous products are available commercially. Most products require 24-36 hours to cure before rainfall and cannot be installed on wet or saturated soils. Generally, products come in 40-50 pound bags and include all necessary ingredients except for seed and fertilizer.
- Install products per manufacturer's instructions.
- BFMs and MBFMs provide good alternatives to blankets in most areas requiring vegetation establishment. Advantages over blankets include:
    - BFM and MBFMs do not require surface preparation.
    - Helicopters can assist in installing BFM and MBFMs in remote areas.
    - On slopes steeper than 2.5H:1V, blanket installers may require ropes and harnesses for safety.
    - Installing BFM and MBFMs can save at least $1,000 per acre compared to blankets.

Maintenance Standards

Reseed any seeded areas that fail to establish at least 75 percent cover (100 percent cover for areas that receive sheet or concentrated flows). If reseeding is ineffective, use an alternate method such as sodding, mulching, nets, or blankets.

- Reseed and protect by mulch any areas that experience erosion after achieving adequate cover. Reseed and protect by mulch any eroded area.
- Supply seeded areas with adequate moisture, but do not water to the extent that it causes run-off.

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies

BMP C121: Mulching

Purpose

Mulching soils provides immediate temporary protection from erosion. Mulch also enhances plant establishment by conserving moisture, holding fertilizer, seed, and topsoil in place, and moderating soil temperatures. There are a variety of mulches that can be used. This section discusses only the most common types of mulch.

Conditions of Use

As a temporary cover measure, mulch should be used:

- For less than 30 days on disturbed areas that require cover.
- At all times for seeded areas, especially during the wet season and during the hot summer months.
- During the wet season on slopes steeper than 3H:1V with more than 10 feet of vertical relief.

Mulch may be applied at any time of the year and must be refreshed periodically.

For seeded areas, mulch may be made up of 100 percent:

- cottonseed meal;
- fibers made of wood, recycled cellulose, hemp, or kenaf;

Maintenance Standards

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- During the wet season on slopes steeper than 3H:1V with more than 10 feet of vertical relief.

Mulch may be applied at any time of the year and must be refreshed periodically.

For seeded areas, mulch may be made up of 100 percent:

- cottonseed meal;
- fibers made of wood, recycled cellulose, hemp, or kenaf;

- compost;
- or blends of these.

Tackifier shall be plant-based, such as guar or alpha plantago, or chemical-based such as polyacrylamide or polymers.

Generally, mulches come in 40-50 pound bags. Seed and fertilizer are added at time of application.

Recycled cellulose may contain polychlorinated biphenyl (PCBs). Ecology recommends that products should be evaluated for PCBs prior to use.

Refer to BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection for conditions of use. PAM shall not be directly applied to water or allowed to enter a water body.

Any mulch or tackifier product used shall be installed per the manufacturer's instructions.

Design and Installation Specifications

For mulch materials, application rates, and specifications, see Table II-3.6: Mulch Standards and Guidelines. Consult with the local supplier or the local conservation district for their recommendations. Increase the application rate until the ground is 95% covered (i.e. not visible under the mulch layer). Note: Thickness may be increased for disturbed areas in or near sensitive areas or other areas highly susceptible to erosion.

Where the option of "Compost" is selected, it should be a coarse compost that meets the size gradations listed in Table II-3.5: Size Gradations of Compost as Mulch Material when tested in accordance with Test Method 02.02-B found in *Test Methods for the Examination of Composting and Compost* (Thompson, 2001).

Table II-3.5: Size Gradations of Compost as Mulch Material

Sieve Size	Percent Passing
3"	100%
1"	90% - 100%
3/4"	70% - 100%
1/4"	40% - 100%

Mulch used within the ordinary high-water mark of surface waters should be selected to minimize potential flotation of organic matter. Composted organic materials have higher specific gravities (densities) than straw, wood, or chipped material. Consult the Hydraulic Permit Authority (HPA) for mulch mixes if applicable.

Maintenance Standards

The thickness of the mulch cover must be maintained.

Any areas that experience erosion shall be remulched and/or protected with a net or blanket. If the erosion problem is drainage related, then the problem shall be fixed and the eroded area remulched.

Table II-3.6: Mulch Standards and Guidelines

Mulch Material	Guideline	Description
Straw	**Quality Standards**	Air-dried; free from undesirable seed and coarse material.
	Application Rates	2"-3" thick; 5 bales per 1,000 sf or 2-3 tons per acre
	Remarks	Cost-effective protection when applied with adequate thickness. Hand-application generally requires greater thickness than blown straw. The thickness of straw may be reduced by half when used in conjunction with seeding. In windy areas straw must be held in place by crimping, using a tackifier, or covering with netting. Blown straw always has to be held in place with a tackifier as even light winds will blow it away. Straw, however, has several deficiencies that should be considered when selecting mulch materials. It often introduces and/or encourages the propagation of weed species and it has no significant long-term benefits It should also not be used within the ordinary high-water elevation of surface waters (due to flotation).
Hydromulch	**Quality Standards**	No growth inhibiting factors.
	Application Rates	Approx. 35-45 lbs per 1,000 sf or 1,500 - 2,000 lbs per acre
	Remarks	Shall be applied with hydromulcher. Shall not be used without seed and tackifier unless the application rate is at least doubled. Fibers longer than about 3/4 - 1 inch clog hydromulch equipment. Fibers should be kept to less than 3/4 inch.
Compost	**Quality Standards**	No visible water or dust during handling. Must be produced per WAC 173-350, Solid Waste Handling Standards, but may have up to 35% biosolids.
	Application Rates	2" thick min.; approx. 100 tons per acre (approx. 750 lbs per cubic yard)
	Remarks	More effective control can be obtained by increasing thickness to 3". Excellent mulch for protecting final grades until landscaping because it can be directly seeded or tilled into soil as an amendment. Compost used for mulch has a coarser size gradation than compost used for BMP C125: Topsoiling / Composting or BMP T5.13: Post-Construction Soil Quality and Depth. It is more stable and practical to use in wet areas and during rainy weather conditions. Do not use near wetlands or near phosphorous impaired water bodies.
Chipped Site Vegetation	**Quality Standards**	Gradations from fines to 6 inches in length for texture, variation, and interlocking properties. Include a mix of various sizes so that the average size is between 2- and 4- inches.
	Application Rates	2" thick min.;

Table II-3.6: Mulch Standards and Guidelines (continued)

Mulch Material	Guideline	Description
	Remarks	This is a cost-effective way to dispose of debris from clearing and grubbing, and it eliminates the problems associated with burning. Generally, it should not be used on slopes above approx. 10% because of its tendency to be transported by runoff. It is not recommended within 200 feet of surface waters. If permanent seeding or planting is expected shortly after mulch, the decomposition of the chipped vegetation may tie up nutrients important to grass establishment. Note: thick application of this material over existing grass, herbaceous species, and some groundcovers could smother and kill vegetation.
Wood-Based Mulch	**Quality Standards**	No visible water or dust during handling. Must be purchased from a supplier with a Solid Waste Handling Permit or one exempt from solid waste regulations.
	Application Rates	2" thick min.; approx. 100 tons per acre (approx. 750 lbs. per cubic yard)
	Remarks	This material is often called "wood straw" or "hog fuel". The use of mulch ultimately improves the organic matter in the soil. Special caution is advised regarding the source and composition of wood-based mulches. Its preparation typically does not provide any weed seed control, so evidence of residual vegetation in its composition or known inclusion of weed plants or seeds should be monitored and prevented (or minimized).
Wood Strand Mulch	**Quality Standards**	A blend of loose, long, thin wood pieces derived from native conifer or deciduous trees with high length-to-width ratio.
	Application Rates	2" thick min.
	Remarks	Cost-effective protection when applied with adequate thickness. A minimum of 95-percent of the wood strand shall have lengths between 2 and 10-inches, with a width and thickness between 1/16 and 1/2-inches. The mulch shall not contain resin, tannin, or other compounds in quantities that would be detrimental to plant life. Sawdust or wood shavings shall not be used as mulch. [Specification 9-14.4(4) from the *Standard Specifications for Road, Bridge, and Municipal Construction* (WSDOT, 2016)

BMP C122: Nets and Blankets

Purpose

Erosion control nets and blankets are intended to prevent erosion and hold seed and mulch in place on steep slopes and in channels so that vegetation can become well established. In addition, some nets and blankets can be used to permanently reinforce turf to protect drainage ways during high flows.

Table II-3.6: Mulch Standards and Guidelines (continued)

Mulch Material	Guideline	Description
	Remarks	This is a cost-effective way to dispose of debris from clearing and grubbing, and it eliminates the problems associated with burning. Generally, it should not be used on slopes above approx. 10% because of its tendency to be transported by runoff. It is not recommended within 200 feet of surface waters. If permanent seeding or planting is expected shortly after mulch, the decomposition of the chipped vegetation may tie up nutrients important to grass establishment. Note: thick application of this material over existing grass, herbaceous species, and some groundcovers could smother and kill vegetation.
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	Application Rates	2" thick min.; approx. 100 tons per acre (approx. 750 lbs. per cubic yard)
	Remarks	This material is often called "wood straw" or "hog fuel". The use of mulch ultimately improves the organic matter in the soil. Special caution is advised regarding the source and composition of wood-based mulches. Its preparation typically does not provide any weed seed control, so evidence of residual vegetation in its composition or known inclusion of weed plants or seeds should be monitored and prevented (or minimized).
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Nets (commonly called matting) are strands of material woven into an open, but high-tensile strength net (for example, coconut fiber matting). Blankets are strands of material that are not tightly woven, but instead form a layer of interlocking fibers, typically held together by a biodegradable or photodegradable netting (for example, excelsior or straw blankets). They generally have lower tensile strength than nets, but cover the ground more completely. Coir (coconut fiber) fabric comes as both nets and blankets.

Conditions of Use

Erosion control netting and blankets shall be made of natural plant fibers unaltered by synthetic materials.

Erosion control nets and blankets should be used:

- To aid permanent vegetated stabilization of slopes 2H:1V or greater and with more than 10 feet of vertical relief.
- For drainage ditches and swales (highly recommended). The application of appropriate netting or blanket to drainage ditches and swales can protect bare soil from channelized runoff while vegetation is established. Nets and blankets also can capture a great deal of sediment due to their open, porous structure. Nets and blankets can be used to permanently stabilize channels and may provide a cost-effective, environmentally preferable alternative to riprap.

Disadvantages of nets and blankets include:

- Surface preparation is required.
- On slopes steeper than 2.5H:1V, net and blanket installers may need to be roped and harnessed for safety.
- They cost at least $4,000-6,000 per acre installed.

Advantages of nets and blankets include:

- Installation without mobilizing special equipment.
- Installation by anyone with minimal training
- Installation in stages or phases as the project progresses.
- Installers can hand place seed and fertilizer as they progress down the slope.
- Installation in any weather.
- There are numerous types of nets and blankets that can be designed with various parameters in mind. Those parameters include: fiber blend, mesh strength, longevity, biodegradability, cost, and availability.

An alternative to nets and blankets in some limited conditions is BMP C202: Riprap Channel Lining. Ensure that BMP C202: Riprap Channel Lining is appropriate before using it as a substitute for nets and blankets.

Design and Installation Specifications

- See Figure II-3.3: Channel Installation (Clackamas County et al., 2008) and Figure II-3.4: Slope Installation for typical orientation and installation of nets and blankets used in channels and as slope protection. Note: these are typical only; all nets and blankets must be installed per manufacturer's installation instructions.
- Installation is critical to the effectiveness of these products. If good ground contact is not achieved, runoff can concentrate under the product, resulting in significant erosion.
- Installation of nets and blankets on slopes:
    1. Complete final grade and track walk up and down the slope.
    2. Install hydromulch with seed and fertilizer.
    3. Dig a small trench, approximately 12 inches wide by 6 inches deep along the top of the slope.
    4. Install the leading edge of the net/blanket into the small trench and staple approximately every 18 inches. NOTE: Staples are metal, "U"-shaped, and a minimum of 6 inches long. Longer staples are used in sandy soils. Biodegradable stakes are also available.
    5. Roll the net/blanket slowly down the slope as the installer walks backward. NOTE: The net/blanket rests against the installer's legs. Staples are installed as the net/blanket is unrolled. It is critical that the proper staple pattern is used for the net/blanket being installed. The net/blanket is not to be allowed to roll down the slope on its own as this stretches the net/blanket, making it impossible to maintain soil contact. In addition, no one is allowed to walk on the net/blanket after it is in place.
    6. If the net/blanket is not long enough to cover the entire slope length, the trailing edge of the upper net/blanket should overlap the leading edge of the lower net/blanket and be stapled. On steeper slopes, this overlap should be installed in a small trench, stapled, and covered with soil.
- With the variety of products available, it is impossible to cover all the details of appropriate use and installation. Therefore, it is critical that the designer consult the manufacturer's information and that a site visit takes place in order to ensure that the product specified is appropriate. Information is also available in WSDOT's *Standard Specifications for Road, Bridge, and Municipal Construction* Division 8-01 and Division 9-14 (WSDOT, 2016).
- Use jute matting in conjunction with mulch (BMP C121: Mulching). Excelsior, woven straw blankets and coir (coconut fiber) blankets may be installed without mulch. There are many other types of erosion control nets and blankets on the market that may be appropriate in certain circumstances.
- In general, most nets (e.g., jute matting) require mulch in order to prevent erosion because they have a fairly open structure. Blankets typically do not require mulch because they usually provide complete protection of the surface.
- Extremely steep, unstable, wet, or rocky slopes are often appropriate candidates for use of synthetic blankets, as are riverbanks, beaches and other high-energy environments. If

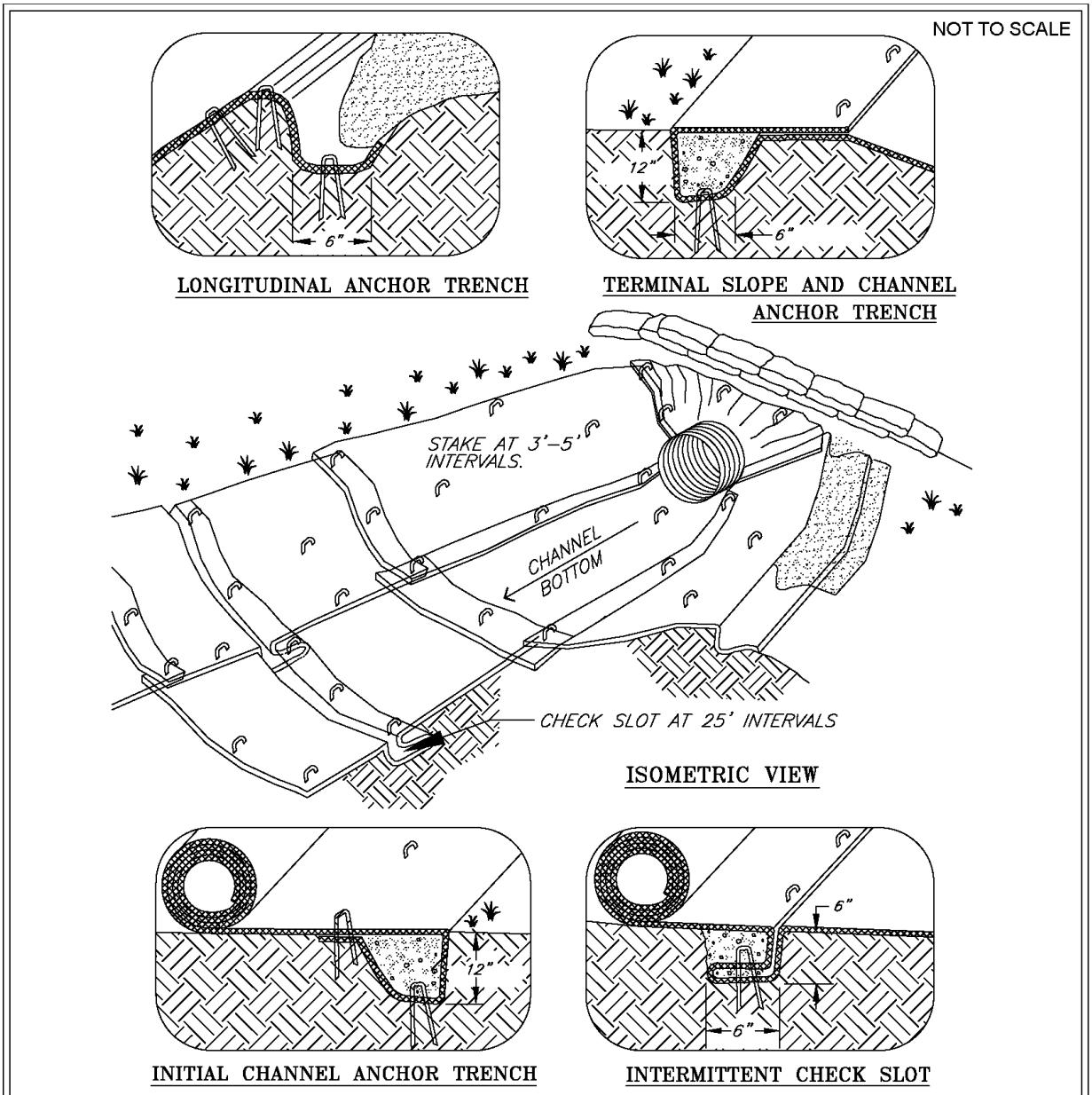
synthetic blankets are used, the soil should be hydromulched first.

- 100-percent biodegradable blankets are available for use in sensitive areas. These organic blankets are usually held together with a paper or fiber mesh and stitching which may last up to a year.
- Most netting used with blankets is photodegradable, meaning it breaks down under sunlight (not UV stabilized). However, this process can take months or years even under bright sun. Once vegetation is established, sunlight does not reach the mesh. It is not uncommon to find non-degraded netting still in place several years after installation. This can be a problem if maintenance requires the use of mowers or ditch cleaning equipment. In addition, birds and small animals can become trapped in the netting.

Maintenance Standards

- Maintain good contact with the ground. Erosion must not occur beneath the net or blanket.
- Repair and staple any areas of the net or blanket that are damaged or not in close contact with the ground.
- Fix and protect eroded areas if erosion occurs due to poorly controlled drainage.

Figure II-3.3: Channel Installation



Notes:
1. Check slots to be constructed per manufacturers specifications.
2. Staking or stapling layout per manufacturers specifications.

(Clackamas County et al., 2008)

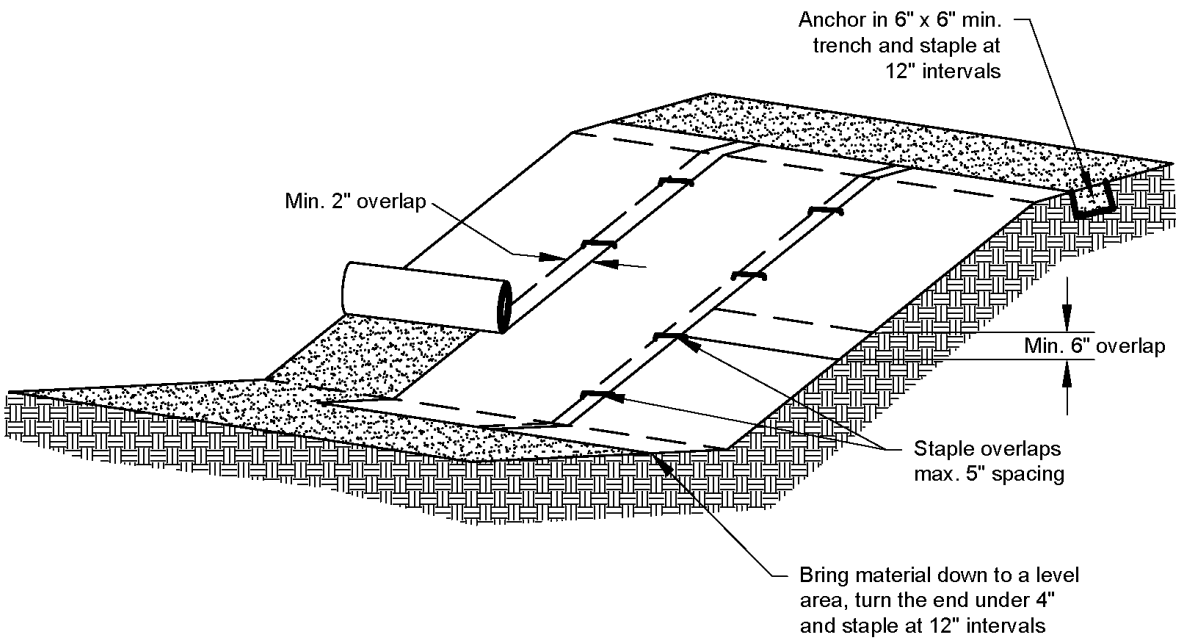
DEPARTMENT OF ECOLOGY
State of Washington

Channel Installation

Revised July 2016

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Figure II-3.4: Slope Installation



Notes:

1. Slope surface shall be smooth before placement for proper soil contact.
2. Stapling pattern as per manufacturer's recommendations.
3. Do not stretch blankets/mattings tight - allow the rolls to mold to any irregularities.
4. For slopes less than 3H:1V, rolls may be placed in horizontal strips.
5. If there is a berm at the top of the slope, anchor upslope of the berm.
6. Lime, fertilize, and seed before installation. Planting of shrubs, trees, etc. should occur after installation.

NOT TO SCALE

DEPARTMENT OF ECOLOGY
State of Washington

Slope Installation

Revised June 2016

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BMP C123: Plastic Covering

Purpose

Plastic covering provides immediate, short-term erosion protection to slopes and disturbed areas.

Conditions of Use

Plastic covering may be used on disturbed areas that require cover measures for less than 30 days, except as stated below.

- Plastic is particularly useful for protecting cut and fill slopes and stockpiles. However, the relatively rapid breakdown of most polyethylene sheeting makes it unsuitable for applications greater than six months.
- Due to rapid runoff caused by plastic covering, do not use this method upslope of areas that might be adversely impacted by concentrated runoff. Such areas include steep and/or unstable slopes.
- Plastic sheeting may result in increased runoff volumes and velocities, requiring additional on-site measures to counteract the increases. Creating a trough with wattles or other material can convey clean water away from these areas.
- To prevent undercutting, trench and backfill rolled plastic covering products.
- Although the plastic material is inexpensive to purchase, the cost of installation, maintenance, removal, and disposal add to the total costs of this BMP.
- Whenever plastic is used to protect slopes, install water collection measures at the base of the slope. These measures include plastic-covered berms, channels, and pipes used to convey clean rainwater away from bare soil and disturbed areas. Do not mix clean runoff from a plastic covered slope with dirty runoff from a project.
- Other uses for plastic include:
    - Temporary ditch liner.
    - Pond liner in temporary sediment pond.
    - Liner for bermed temporary fuel storage area if plastic is not reactive to the type of fuel being stored.
    - Emergency slope protection during heavy rains.
    - Temporary drainpipe (“elephant trunk”) used to direct water.

Design and Installation Specifications

- Plastic slope cover must be installed as follows:
    1. Run plastic up and down the slope, not across the slope.
    2. Plastic may be installed perpendicular to a slope if the slope length is less than 10 feet.

3. Provide a minimum of 8-inch overlap at the seams.
4. On long or wide slopes, or slopes subject to wind, tape all seams.
5. Place plastic into a small (12-inch wide by 6-inch deep) slot trench at the top of the slope and backfill with soil to keep water from flowing underneath.
6. Place sand filled burlap or geotextile bags every 3 to 6 feet along seams and tie them together with twine to hold them in place.
7. Inspect plastic for rips, tears, and open seams regularly and repair immediately. This prevents high velocity runoff from contacting bare soil, which causes extreme erosion.
8. Sandbags may be lowered into place tied to ropes. However, all sandbags must be staked in place.

- Plastic sheeting shall have a minimum thickness of 0.06 millimeters.
- If erosion at the toe of a slope is likely, a gravel berm, riprap, or other suitable protection shall be installed at the toe of the slope in order to reduce the velocity of runoff.

Maintenance Standards

- Torn sheets must be replaced and open seams repaired.
- Completely remove and replace the plastic if it begins to deteriorate due to ultraviolet radiation.
- Completely remove plastic when no longer needed.
- Dispose of old tires used to weight down plastic sheeting appropriately.

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

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BMP C124: Sodding

Purpose

The purpose of sodding is to establish turf for immediate erosion protection and to stabilize drainage paths where concentrated overland flow will occur.

BMP C125: Topsoiling / Composting

Purpose

Topsoiling and composting provide a suitable growth medium for final site stabilization with vegetation. While not a permanent cover practice in itself, topsoiling and composting are an integral component of providing permanent cover in those areas where there is an unsuitable soil surface for plant growth. Use this BMP in conjunction with other BMPs such as BMP C120: Temporary and Permanent Seeding, BMP C121: Mulching, or BMP C124: Sodding. Implementation of this BMP may meet the post-construction requirements of BMP T5.13: Post-Construction Soil Quality and Depth.

Native soils and disturbed soils that have been organically amended not only retain much more stormwater, but also serve as effective biofilters for urban pollutants and, by supporting more vigorous plant growth, reduce the water, fertilizer and pesticides needed to support installed landscapes. Topsoil does not include any subsoils but only the material from the top several inches including organic debris.

Conditions of Use

- Permanent landscaped areas shall contain healthy topsoil that reduces the need for fertilizers, improves overall topsoil quality, provides for better vegetative health and vitality, improves hydrologic characteristics, and reduces the need for irrigation.
- Leave native soils and the duff layer undisturbed to the maximum extent practicable. Stripping of existing, properly functioning soil system and vegetation for the purpose of topsoiling during construction is not acceptable. Preserve existing soil systems in undisturbed and uncompacted conditions if functioning properly.
- Areas that already have good topsoil, such as undisturbed areas, do not require soil amendments.
- Restore, to the maximum extent practical, native soils disturbed during clearing and grading to a condition equal to or better than the original site condition's moisture-holding capacity. Use on-site native topsoil, incorporate amendments into on-site soil, or import blended topsoil to meet this requirement.
- Topsoiling is a required procedure when establishing vegetation on shallow soils, and soils of critically low pH (high acid) levels.
- Beware of where the topsoil comes from, and what vegetation was on site before disturbance. Invasive plant seeds may be included and could cause problems for establishing native plants, landscaped areas, or grasses.
- Topsoil from the site will contain mycorrhizal bacteria that are necessary for healthy root growth and nutrient transfer. These native mycorrhiza are acclimated to the site and will provide optimum conditions for establishing grasses. Use commercially available mycorrhiza products when using off-site topsoil.

Design and Installation Specifications

Meet the following requirements for disturbed areas that will be developed as lawn or landscaped areas at the completed project site:

- Maximize the depth of the topsoil wherever possible to provide the maximum possible infiltration capacity and beneficial growth medium. Topsoil shall have:
    - A minimum depth of 8-inches. Scarify subsoils below the topsoil layer at least 4-inches with some incorporation of the upper material to avoid stratified layers, where feasible. Ripping or re-structuring the subgrade may also provide additional benefits regarding the overall infiltration and interflow dynamics of the soil system.
    - A minimum organic content of 10% dry weight in planting beds, and 5% organic matter content in turf areas. Incorporate organic amendments to a minimum 8-inch depth except where tree roots or other natural features limit the depth of incorporation.
    - A pH between 6.0 and 8.0 or matching the pH of the undisturbed soil.
    - If blended topsoil is imported, then fines should be limited to 25 percent passing through a 200 sieve.
- Mulch planting beds with 2 inches of organic material
- Accomplish the required organic content, depth, and pH by returning native topsoil to the site, importing topsoil of sufficient organic content, and/or incorporating organic amendments. When using the option of incorporating amendments to meet the organic content requirement, use compost that meets the compost specification for Bioretention (See BMP T7.30: Bioretention), with the exception that the compost may have up to 35% biosolids or manure.
- Sections 3 through 7 of *Building Soil: Guidelines and Resources for Implementing Soil Quality and Depth BMP T5.13 in WDOE Stormwater Management Manual for Western Washington* (Stenn et al., 2016), provides useful guidance for implementing whichever option is chosen. It includes guidance for pre-approved default strategies and guidance for custom strategies. Check with your local jurisdiction concerning its acceptance of this guidance.
- The final composition and construction of the soil system will result in a natural selection or favoring of certain plant species over time. For example, incorporation of topsoil may favor grasses, while layering with mildly acidic, high-carbon amendments may favor more woody vegetation.
- Allow sufficient time in scheduling for topsoil spreading prior to seeding, sodding, or planting.
- Take care when applying top soil to subsoils with contrasting textures. Sandy topsoil over clayey subsoil is a particularly poor combination, as water creeps along the junction between the soil layers and causes the topsoil to slough. If topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly and it will be difficult to establish vegetation. The best method to promote bonding is to actually work the topsoil into the layer below for a depth of at least 6 inches.
- Field exploration of the site shall be made to determine if there is surface soil of sufficient quantity and quality to justify stripping. Topsoil shall be friable and loamy (loam, sandy loam,

silt loam, sandy clay loam, and clay loam). Avoid areas of natural ground water recharge.

- Stripping shall be confined to the immediate construction area. A 4-inch to 6-inch stripping depth is common, but depth may vary depending on the particular soil. All surface runoff control structures shall be in place prior to stripping.
- Do not place topsoil while in a frozen or muddy condition, when the subgrade is excessively wet, or when conditions exist that may otherwise be detrimental to proper grading or proposed sodding or seeding.
- In any areas requiring grading, remove and stockpile the duff layer and topsoil on site in a designated, controlled area, not adjacent to public resources and critical areas. Reapply stockpiled topsoil to other portions of the site where feasible.
- Locate the topsoil stockpile so that it meets specifications and does not interfere with work on the site. It may be possible to locate more than one pile in proximity to areas where topsoil will be used.
- Stockpiling of topsoil shall occur in the following manner:
    - Side slopes of the stockpile shall not exceed 2H:1V.
    - Between October 1 and April 30:
        - An interceptor dike with gravel outlet and silt fence shall surround all topsoil.
        - Within 2 days complete erosion control seeding, or covering stockpiles with clear plastic, or other mulching materials.
    - Between May 1 and September 30:
        - An interceptor dike with gravel outlet and silt fence shall surround all topsoil if the stockpile will remain in place for a longer period of time than active construction grading.
        - Within 7 days complete erosion control seeding, or covering stockpiles with clear plastic, or other mulching materials.
- When native topsoil is to be stockpiled and reused the following should apply to ensure that the mycorrhizal bacterial, earthworms, and other beneficial organisms will not be destroyed:
    - Re-install topsoil within 4 to 6 weeks.
    - Do not allow the saturation of topsoil with water.
    - Do not use plastic covering.

Maintenance Standards

- Inspect stockpiles regularly, especially after large storm events. Stabilize any areas that have eroded.
- Establish soil quality and depth toward the end of construction and once established, protect from compaction, such as from large machinery use, and from erosion.

- Plant and mulch soil after installation.
- Leave plant debris or its equivalent on the soil surface to replenish organic matter.
- Reduce and adjust, where possible, the use of irrigation, fertilizers, herbicides and pesticides, rather than continuing to implement formerly established practices.

BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection

Purpose

Polyacrylamide (PAM) is used on construction sites to prevent soil erosion.

Applying PAM to bare soil in advance of a rain event significantly reduces erosion and controls sediment in two ways. First, PAM increases the soil's available pore volume, thus increasing infiltration and reducing the quantity of stormwater runoff. Second, it increases flocculation of suspended particles and aids in their deposition, thus reducing stormwater runoff turbidity and improving water quality.

Conditions of Use

PAM shall not be directly applied to water or allowed to enter a water body. Stormwater runoff shall pass through a sediment pond prior to discharging to surface waters.

PAM can be applied to bare soil under the following conditions:

- During rough grading operations.
- In Staging areas.
- Balanced cut and fill earthwork.
- Haul roads prior to placement of crushed rock surfacing.
- Compacted soil roadbase.
- Stockpiles.
- After final grade and before paving or final seeding and planting.
- Pit sites.
- Sites having a winter shut down. In the case of winter shut down, or where soil will remain unworked for several months, PAM should be used together with mulch.

Design and Installation Specifications

- Do not use PAM on a slope that flows directly into a stream or wetland.
- Do not add PAM to water discharging from the site.

- PAM designated for these uses should be "water soluble" or "linear" or "non-crosslinked". Cross-linked or water absorbent PAM, polymerized in highly acidic (pH<2) conditions, are used to maintain soil moisture content.
- The PAM anionic charge density may vary from 2-30 percent; a value of 18 percent is typical. Studies conducted by the United States Department of Agriculture (USDA)/ARS demonstrated that soil stabilization was optimized by using very high molecular weight (12-15 mg/-mole), highly anionic (>20% hydrolysis) PAM.
- PAM tackifiers are available and being used in place of guar and alpha plantago. Typically, PAM tackifiers should be used at a mixing rate of no more than 0.5-1 lb. per 1000 gallons of water in a hydromulch machine. Some tackifier product instructions say to use at an application rate of 3 – 5 lbs per acre, which can be too much. In addition, pump problems can occur at higher application rates due to increased viscosity.

Maintenance Standards

- PAM may be reapplied on actively worked areas after a 48-hour period.
- Reapplication is not required unless PAM treated soil is disturbed or unless turbidity levels show the need for an additional application. If PAM treated soil is left undisturbed, a reapplication may be necessary after two months. More PAM applications may be required for steep slopes, silty and clayey soils (USDA Classification Type "C" and "D" soils), long grades, and high precipitation areas. When PAM is applied first to bare soil and then covered with straw, a reapplication may not be necessary for several months.
- Loss of sediment and PAM may be a basis for penalties per RCW 90.48.080.
- PAM may affect the treatment efficiency of chitosan flocculent systems.

BMP C130: Surface Roughening

Purpose

Surface roughening aids in the establishment of vegetative cover, reduces runoff velocity, increases infiltration, and provides for sediment trapping through the provision of a rough soil surface. Horizontal depressions are created by operating a tiller or other suitable equipment on the contour or by leaving slopes in a roughened condition by not fine grading them.

Use this BMP in conjunction with other BMPs such as BMP C120: Temporary and Permanent Seeding, BMP C121: Mulching, or BMP C124: Sodding.

Conditions for Use

- All slopes steeper than 3H:1V and greater than 5 vertical feet require surface roughening to a depth of 2 to 4 inches prior to seeding.
- Areas that will not be stabilized immediately may be roughened to reduce runoff velocity until seeding takes place.

- Slopes with a stable rock face do not require roughening.
- Slopes where mowing is planned should not be excessively roughened.

Design and Installation Specifications

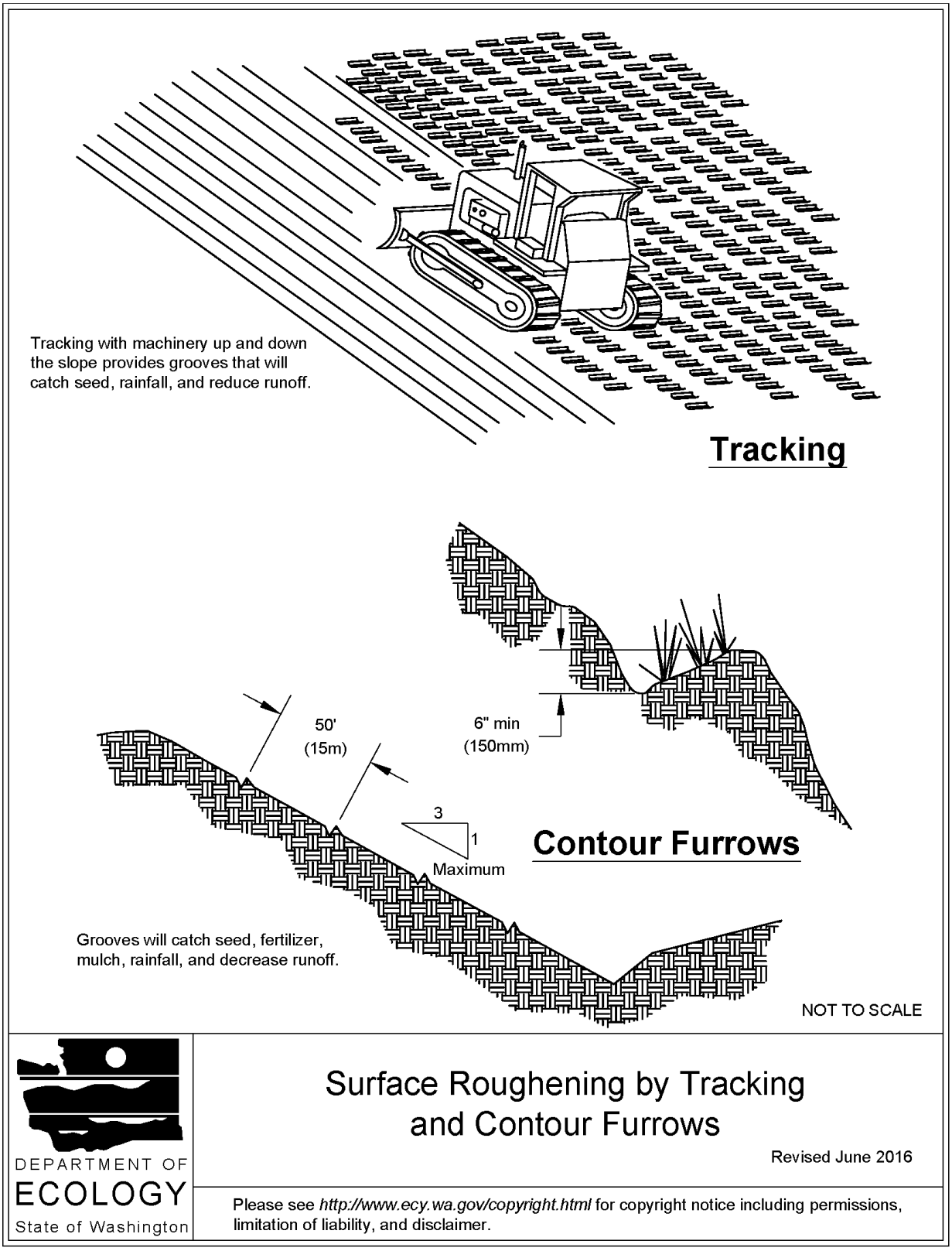
There are different methods for achieving a roughened soil surface on a slope, and the selection of an appropriate method depends upon the type of slope. Roughening methods include stair-step grading, grooving, contour furrows, and tracking. See Figure II-3.5: Surface Roughening by Tracking and Contour Furrows. Factors to be considered in choosing a roughening method are slope steepness, mowing requirements, and whether the slope is formed by cutting or filling.

- Disturbed areas that will not require mowing may be stair-step graded, grooved, or left rough after filling.
- Stair-step grading is particularly appropriate in soils containing large amounts of soft rock. Each "step" catches material that sloughs from above, and provides a level site where vegetation can become established. Stairs should be wide enough to work with standard earth moving equipment. Stair steps must be on contour or gullies will form on the slope.
- Areas that will be mowed (these areas should have slopes less steep than 3H:1V) may have small furrows left by disking, harrowing, raking, or seed-planting machinery operated on the contour.
- Graded areas with slopes steeper than 3H:1V but less than 2H:1V should be roughened before seeding. This can be accomplished in a variety of ways, including "track walking," or driving a crawler tractor up and down the slope, leaving a pattern of cleat imprints parallel to slope contours.
- Tracking is done by operating equipment up and down the slope to leave horizontal depressions in the soil.

Maintenance Standards

- Areas that are surface roughened should be seeded as quickly as possible.
- Regular inspections should be made of the area. If rills appear, they should be re-roughened and re-seeded immediately.

Figure II-3.5: Surface Roughening by Tracking and Contour Furrows



BMP C140: Dust Control

Purpose

Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters.

Conditions of Use

Use dust control in areas (including roadways) subject to surface and air movement of dust where on-site or off-site impacts to roadways, drainage ways, or surface waters are likely.

Design and Installation Specifications

- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.
- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition. Maintain the original ground cover as long as practical.
- Construct natural or artificial windbreaks or windscreens. These may be designed as enclosures for small dust sources.
- Sprinkle the site with water until the surface is wet. Repeat as needed. To prevent carryout of mud onto the street, refer to BMP C105: Stabilized Construction Access and BMP C106: Wheel Wash.
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative, following the manufacturer's instructions and cautions regarding handling and application. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM (BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection) added to water at a rate of 0.5 pounds per 1,000 gallons of water per acre and applied from a water truck is more effective than water alone. This is due to increased infiltration of water into the soil and reduced evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may reduce the quantity of water needed for dust control. Note that the application rate specified here applies to this BMP, and is not the same application rate that is specified in BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection, but the downstream protections still apply.

  Refer to BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection for conditions of use. PAM shall not be directly applied to water or allowed to enter a water body.
- Contact your local Air Pollution Control Authority for guidance and training on other dust control measures. Compliance with the local Air Pollution Control Authority constitutes

compliance with this BMP.

- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Techniques that can be used for unpaved roads and lots include:
    - Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
    - Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
    - Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.
    - Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
    - Encourage the use of alternate, paved routes, if available.
    - Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
    - Limit dust-causing work on windy days.
    - Pave unpaved permanent roads and other trafficked areas.

Maintenance Standards

Respray area as necessary to keep dust to a minimum.

BMP C150: Materials on Hand

Purpose

Keep quantities of erosion prevention and sediment control materials on the project site at all times to be used for regular maintenance and emergency situations such as unexpected heavy rains. Having these materials on-site reduces the time needed to replace existing or implement new BMPs when inspections indicate that existing BMPs are not meeting the Construction SWPPP requirements. In addition, contractors can save money by buying some materials in bulk and storing them at their office or yard.

Conditions of Use

- Construction projects of any size or type can benefit from having materials on hand. A small commercial development project could have a roll of plastic and some gravel available for immediate protection of bare soil and temporary berm construction. A large earthwork project, such as highway construction, might have several tons of straw, several rolls of plastic, flexible

compliance with this BMP.

- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Techniques that can be used for unpaved roads and lots include:
    - Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
    - Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
    - Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.
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pipe, sandbags, geotextile fabric and steel “T” posts.

- Materials should be stockpiled and readily available before any site clearing, grubbing, or earthwork begins. A large contractor or project proponent could keep a stockpile of materials that are available for use on several projects.
- If storage space at the project site is at a premium, the contractor could maintain the materials at their office or yard. The office or yard must be less than an hour from the project site.

Design and Installation Specifications

Depending on project type, size, complexity, and length, materials and quantities will vary. A good minimum list of items that will cover numerous situations includes:

- Clear Plastic, 6 mil
- Drainpipe, 6 or 8 inch diameter
- Sandbags, filled
- Straw Bales for mulching
- Quarry Spalls
- Washed Gravel
- Geotextile Fabric
- Catch Basin Inserts
- Steel "T" Posts
- Silt fence material
- Straw Wattles

Maintenance Standards

- All materials with the exception of the quarry spalls, steel “T” posts, and gravel should be kept covered and out of both sun and rain.
- Re-stock materials as needed.

BMP C151: Concrete Handling

Purpose

Concrete work can generate process water and slurry that contain fine particles and high pH, both of which can violate water quality standards in the receiving water. Concrete spillage or concrete discharge to waters of the State is prohibited. Use this BMP to minimize and eliminate concrete, concrete process water, and concrete slurry from entering waters of the State.

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Conditions of Use

Any time concrete is used, utilize these management practices. Concrete construction project components include, but are not limited to:

- Curbs
- Sidewalks
- Roads
- Bridges
- Foundations
- Floors
- Runways

Disposal options for concrete, in order of preference are:

1. Off-site disposal
2. Concrete wash-out areas (see BMP C154: Concrete Washout Area)
3. De minimus washout to formed areas awaiting concrete

Design and Installation Specifications

- Wash concrete truck drums at an approved off-site location or in designated concrete washout areas only. Do not wash out concrete trucks onto the ground (including formed areas awaiting concrete), or into storm drains, open ditches, streets, or streams. Refer to BMP C154: Concrete Washout Area for information on concrete washout areas.
    - Return unused concrete remaining in the truck and pump to the originating batch plant for recycling. Do not dump excess concrete on site, except in designated concrete washout areas as allowed in BMP C154: Concrete Washout Area.
- Wash small concrete handling equipment (e.g. hand tools, screeds, shovels, rakes, floats, trowels, and wheelbarrows) into designated concrete washout areas or into formed areas awaiting concrete pour.
- At no time shall concrete be washed off into the footprint of an area where an infiltration feature will be installed.
- Wash equipment difficult to move, such as concrete paving machines, in areas that do not directly drain to natural or constructed stormwater conveyance or potential infiltration areas.
- Do not allow washwater from areas, such as concrete aggregate driveways, to drain directly (without detention or treatment) to natural or constructed stormwater conveyances.
- Contain washwater and leftover product in a lined container when no designated concrete washout areas (or formed areas, allowed as described above) are available. Dispose of contained concrete and concrete washwater (process water) properly.

- Always use forms or solid barriers for concrete pours, such as pilings, within 15-feet of surface waters.
- Refer to BMP C252: Treating and Disposing of High pH Water for pH adjustment requirements.
- Refer to the Construction Stormwater General Permit (CSWGP) for pH monitoring requirements if the project involves one of the following activities:
    - Significant concrete work (as defined in the CSWGP).
    - The use of soils amended with (but not limited to) Portland cement-treated base, cement kiln dust or fly ash.
    - Discharging stormwater to segments of water bodies on the 303(d) list (Category 5) for high pH.

Maintenance Standards

Check containers for holes in the liner daily during concrete pours and repair the same day.

BMP C152: Sawcutting and Surfacing Pollution Prevention

Purpose

Sawcutting and surfacing operations generate slurry and process water that contains fine particles and high pH (concrete cutting), both of which can violate the water quality standards in the receiving water. Concrete spillage or concrete discharge to waters of the State is prohibited. Use this BMP to minimize and eliminate process water and slurry created through sawcutting or surfacing from entering waters of the State.

Conditions of Use

Utilize these management practices anytime sawcutting or surfacing operations take place. Sawcutting and surfacing operations include, but are not limited to:

- Sawing
- Coring
- Grinding
- Roughening
- Hydro-demolition
- Bridge and road surfacing

- Always use forms or solid barriers for concrete pours, such as pilings, within 15-feet of surface waters.
- Refer to BMP C252: Treating and Disposing of High pH Water for pH adjustment requirements.
- Refer to the Construction Stormwater General Permit (CSWGP) for pH monitoring requirements if the project involves one of the following activities:
    - Significant concrete work (as defined in the CSWGP).
    - The use of soils amended with (but not limited to) Portland cement-treated base, cement kiln dust or fly ash.
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Maintenance Standards

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Conditions of Use

Utilize these management practices anytime sawcutting or surfacing operations take place. Sawcutting and surfacing operations include, but are not limited to:

- Sawing
- Coring
- Grinding
- Roughening
- Hydro-demolition
- Bridge and road surfacing

Design and Installation Specifications

- Vacuum slurry and cuttings during cutting and surfacing operations.
- Slurry and cuttings shall not remain on permanent concrete or asphalt pavement overnight.
- Slurry and cuttings shall not drain to any natural or constructed drainage conveyance including stormwater systems. This may require temporarily blocking catch basins.
- Dispose of collected slurry and cuttings in a manner that does not violate ground water or surface water quality standards.
- Do not allow process water generated during hydro-demolition, surface roughening or similar operations to drain to any natural or constructed drainage conveyance including stormwater systems. Dispose of process water in a manner that does not violate ground water or surface water quality standards.
- Handle and dispose of cleaning waste material and demolition debris in a manner that does not cause contamination of water. Dispose of sweeping material from a pick-up sweeper at an appropriate disposal site.

Maintenance Standards

Continually monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. If inspections show that a violation of water quality standards could occur, stop operations and immediately implement preventive measures such as berms, barriers, secondary containment, and/or vacuum trucks.

BMP C153: Material Delivery, Storage, and Containment

Purpose

Prevent, reduce, or eliminate the discharge of pollutants to the stormwater system or watercourses from material delivery and storage. Minimize the storage of hazardous materials on-site, store materials in a designated area, and install secondary containment.

Conditions of Use

Use at construction sites with delivery and storage of the following materials:

- Petroleum products such as fuel, oil and grease
- Soil stabilizers and binders (e.g., Polyacrylamide)
- Fertilizers, pesticides and herbicides
- Detergents
- Asphalt and concrete compounds

Design and Installation Specifications

- Vacuum slurry and cuttings during cutting and surfacing operations.
- Slurry and cuttings shall not remain on permanent concrete or asphalt pavement overnight.
- Slurry and cuttings shall not drain to any natural or constructed drainage conveyance including stormwater systems. This may require temporarily blocking catch basins.
- Dispose of collected slurry and cuttings in a manner that does not violate ground water or surface water quality standards.
- Do not allow process water generated during hydro-demolition, surface roughening or similar operations to drain to any natural or constructed drainage conveyance including stormwater systems. Dispose of process water in a manner that does not violate ground water or surface water quality standards.
- Handle and dispose of cleaning waste material and demolition debris in a manner that does not cause contamination of water. Dispose of sweeping material from a pick-up sweeper at an appropriate disposal site.

Maintenance Standards

Continually monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. If inspections show that a violation of water quality standards could occur, stop operations and immediately implement preventive measures such as berms, barriers, secondary containment, and/or vacuum trucks.

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Prevent, reduce, or eliminate the discharge of pollutants to the stormwater system or watercourses from material delivery and storage. Minimize the storage of hazardous materials on-site, store materials in a designated area, and install secondary containment.

Conditions of Use

Use at construction sites with delivery and storage of the following materials:

- Petroleum products such as fuel, oil and grease
- Soil stabilizers and binders (e.g., Polyacrylamide)
- Fertilizers, pesticides and herbicides
- Detergents
- Asphalt and concrete compounds

- Hazardous chemicals such as acids, lime, adhesives, paints, solvents, and curing compounds
- Any other material that may be detrimental if released to the environment

Design and Installation Specifications

- The temporary storage area should be located away from vehicular traffic, near the construction entrance(s), and away from waterways or storm drains.
- Safety Data Sheets (SDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers.
- Hazardous material storage on-site should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- During the wet weather season (Oct 1 – April 30), consider storing materials in a covered area.
- Materials should be stored in secondary containments, such as an earthen dike, horse trough, or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, within secondary containment.
- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting.
- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 shall be stored in approved containers and drums and shall not be overfilled. Containers and drums shall be stored in temporary secondary containment facilities.
- Temporary secondary containment facilities shall provide for a spill containment volume able to contain 10% of the total enclosed container volume of all containers, or 110% of the capacity of the largest container within its boundary, whichever is greater.
- Secondary containment facilities shall be impervious to the materials stored therein for a minimum contact time of 72 hours.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- During the wet weather season (Oct 1 – April 30), each secondary containment facility shall be covered during non-working days, prior to and during rain events.
- Keep material storage areas clean, organized and equipped with an ample supply of appropriate spill clean-up material (spill kit).
- The spill kit should include, at a minimum:

- 1-Water Resistant Nylon Bag
- 3-Oil Absorbent Socks 3”x 4’
- 2-Oil Absorbent Socks 3”x 10’
- 12-Oil Absorbent Pads 17”x19”
- 1-Pair Splash Resistant Goggles
- 3-Pair Nitrile Gloves
- 10-Disposable Bags with Ties
- Instructions

Maintenance Standards

- Secondary containment facilities shall be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills shall be collected and placed into drums. These liquids shall be handled as hazardous waste unless testing determines them to be non-hazardous.
- Re-stock spill kit materials as needed.

BMP C154: Concrete Washout Area

Purpose

Prevent or reduce the discharge of pollutants from concrete waste to stormwater by conducting washout off-site, or performing on-site washout in a designated area.

Conditions of Use

Concrete washout areas are implemented on construction projects where:

- Concrete is used as a construction material
- It is not possible to dispose of all concrete wastewater and washout off-site (ready mix plant, etc.).
- Concrete truck drums are washed on-site.

  Note that auxiliary concrete truck components (e.g. chutes and hoses) and small concrete handling equipment (e.g. hand tools, screeds, shovels, rakes, floats, trowels, and wheel-barrows) may be washed into formed areas awaiting concrete pour.

At no time shall concrete be washed off into the footprint of an area where an infiltration feature will be installed.

BMP C201: Grass-Lined Channels

Purpose

To provide a channel with a vegetative lining for conveyance of runoff. The purpose of the vegetative lining is to prevent transport of sediment and erosion.

Conditions of Use

This practice applies to construction sites where concentrated runoff needs to be directed to prevent erosion or flooding.

- Use this BMP when a vegetative lining can provide sufficient stability for the channel cross section and at lower velocities of water (normally dependent on grade). This means that the channel slopes are generally less than 5 percent and space is available for a relatively large cross section.
- Typical uses include roadside ditches, channels at property boundaries, outlets for diversions, and other channels and drainage ditches in low areas.
- Channels that will be vegetated should be installed before major earthwork and hydroseeded with a bonded fiber matrix (BFM). The vegetation should be well established (i.e., 75 percent cover) before water is allowed to flow in the ditch unless BMP C122: Nets and Blankets is used to protect the channel. With channels that will have high flows, erosion control blankets should be installed over the hydroseed. If vegetation cannot be established from seed before water is allowed in the ditch, sod should be installed in the bottom of the ditch in lieu of hydromulch and blankets.

Design and Installation Specifications

See Figure II-3.10: Typical Grass-Lined Channels

Locate channels where they can conform to the topography and other features such as roads. Use natural drainage systems to the greatest extent possible

- Avoid sharp changes in alignment or bends and changes in grade.
- Do not reshape the landscape to fit the drainage channel.
- The maximum design velocity shall be based on soil conditions, type of vegetation, and method of revegetation, but at no time shall velocity exceed 5 feet/second. The channel shall not be overtopped by the peak volumetric flow rate calculated by one of the following methods:
    - Single Event Hydrograph Method: The peak volumetric flow rate calculated using a 10-minute time step from a Type 1A, 10-year, 24-hour frequency storm for the worst-case land cover condition.

      OR

    - Continuous Simulation Method: The 10-year peak flow rate, as determined by an

approved continuous runoff model with a 15-minute time step for the worst-case land cover condition..

Worst-case land cover conditions (i.e., producing the most runoff) should be used for analysis (in most cases, this would be the land cover conditions just prior to final landscaping).

- Where the grass-lined channel will also function as a permanent stormwater conveyance facility, consult the drainage conveyance requirements of the local jurisdiction.
- An established grass or vegetated lining is required before the channel can be used to convey stormwater, unless stabilized with nets or blankets (See BMP C122: Nets and Blankets).
- If design velocity of a channel to be vegetated by seeding exceeds 2 ft/sec, a temporary channel liner is required. Geotextile or special mulch protection such as fiberglass roving or straw and netting provides stability until the vegetation is fully established. See Figure II-3.11: Temporary Channel Liners.
- Check dams shall be removed when the grass has matured sufficiently to protect the ditch or swale unless the slope of the swale is greater than 4 percent. The area beneath the check dams shall be seeded and mulched immediately after dam removal.
- If vegetation is established by sodding, the permissible velocity for established vegetation may be used and no temporary liner is needed.
- Do not subject the grass-lined channel to sedimentation from disturbed areas. Use sediment-trapping BMPs upstream of the channel.
- V-shaped grass channels generally apply where the quantity of water is small, such as in short reaches along roadsides. The V-shaped cross section is least desirable because it is difficult to stabilize the bottom where velocities may be high.
- Trapezoidal grass channels are used where runoff volumes are large and slope is low so that velocities are nonerosive to vegetated linings. (Note: it is difficult to construct small parabolic shaped channels.)
- Subsurface drainage or riprap channel bottoms may be necessary on sites that are subject to prolonged wet conditions due to long duration flows or a high water table.
- Provide outlet protection at culvert ends and at channel intersections.
- Grass channels, at a minimum, should carry peak runoff for temporary construction drainage facilities from the 10-year, 24-hour storm without eroding. Where flood hazard exists, increase the capacity according to the potential damage.
- Grassed channel side slopes generally are constructed 3H:1V or flatter to aid in the establishment of vegetation and for maintenance.
- Construct channels a minimum of 0.2 foot larger around the periphery to allow for soil bulking during seedbed preparations and sod buildup.

Maintenance Standards

During the establishment period, check grass-lined channels after every rainfall.

- After grass is established, periodically check the channel; check it after every heavy rainfall event. Immediately make repairs.
- Check the channel outlet and all road crossings for bank stability and evidence of piping or scour holes.
- Remove all significant sediment accumulations to maintain the designed carrying capacity. Keep the grass in a healthy, vigorous condition at all times, since it is the primary erosion protection for the channel.

Figure II-3.10: Typical Grass-Lined Channels

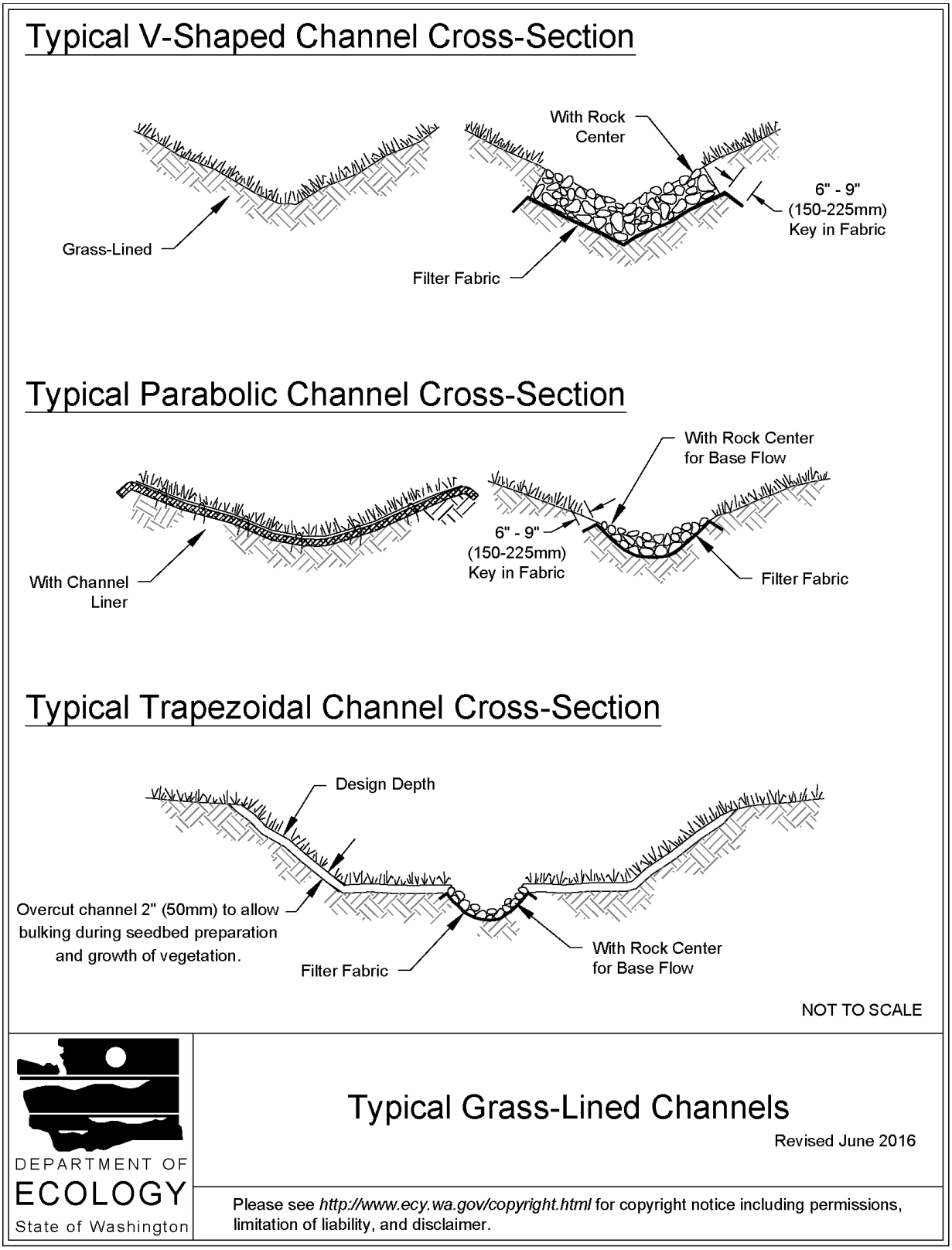
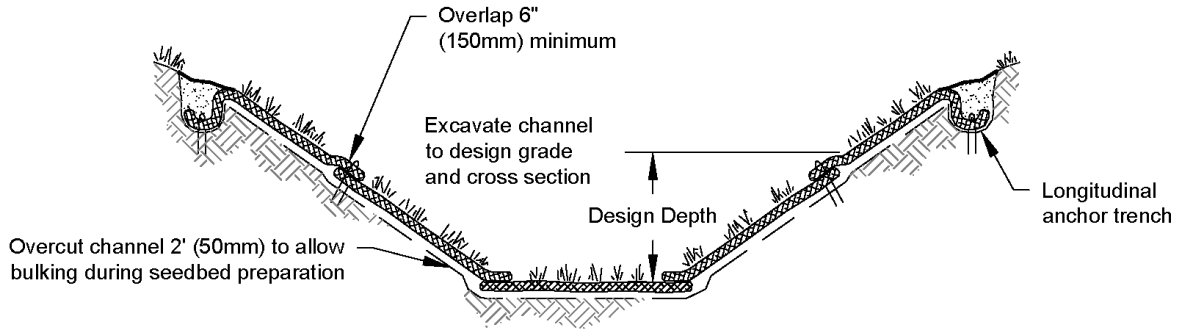
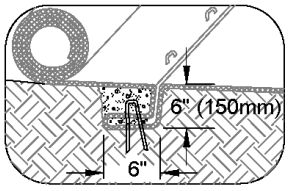


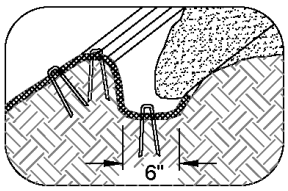
Figure II-3.11: Temporary Channel Liners



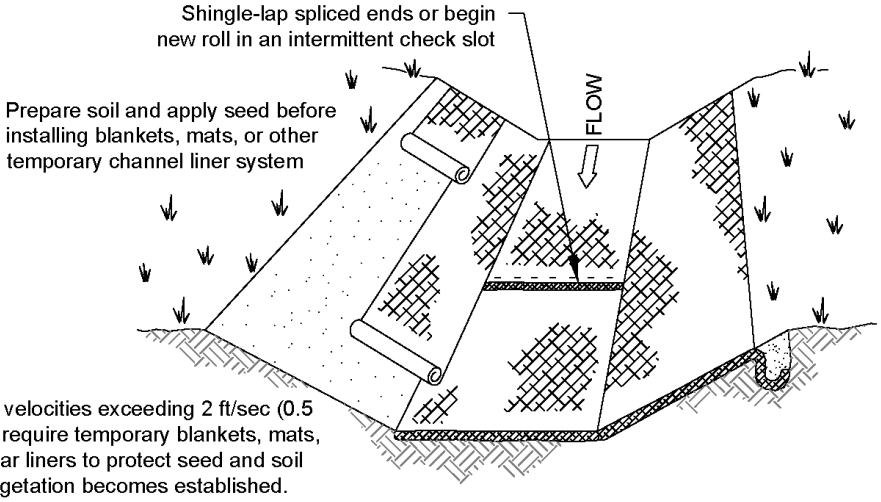


Intermittent Check Slot

Typical installation with erosion control blankets or turf reinforcement mats



Longitudinal Anchor Trench



Notes:

1. Design velocities exceeding 2 ft/sec (0.5 m/sec) require temporary blankets, mats, or similar liners to protect seed and soil until vegetation becomes established.
2. Grass-lined channels with design velocities exceeding 6 ft/sec (2 m/sec) should include turf reinforcement mats.

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State of Washington

Temporary Channel Liners

Revised July 2016

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BMP C204: Pipe Slope Drains

Purpose

The purpose of pipe slope drains is to prevent gullies, channel erosion, and saturation of slide-prone soils by using a pipe to convey stormwater away from or over bare soil.

Conditions of Use

Pipe slope drains should be used when a temporary or permanent stormwater conveyance is needed to move water down a steep slope to avoid erosion.

Pipe slope drains should be used at bridge ends to collect runoff and convey it to the base of the fill slopes along the bridge approaches. Another use on road projects is to collect runoff from pavement in a pipe slope drain and convey it away from side slopes.

Temporary installations of pipe slope drains can be useful because there is generally a time lag between having the first lift of asphalt installed and the curbs, gutters, and permanent drainage installed. Used in conjunction with sand bags, or other temporary diversion devices, these will prevent massive amounts of sediment from leaving a project.

Pipe slope drains can serve the following purposes:

- Connection to new catch basins and temporarily use until permanent piping is installed.
- Drainage of water collected from aquifers exposed on cut slopes and conveyance of water to the base of the slope.
- Collection of clean runoff from plastic sheeting and routing the runoff away from exposed soil.
- Installation in conjunction with silt fence to drain collected water to a controlled area.
- Diversion of small seasonal streams away from construction. They have been used successfully on culvert replacement and extension jobs. Large flex pipe can be used on larger streams during culvert removal, repair, or replacement.
- Connection to existing downspouts and roof drains and diversion of water away from work areas during building renovation, demolition, and construction projects.

There are several commercially available collectors that attach to the pipe inlet and help prevent erosion at the inlet.

Design and Installation Specifications

See Figure II-3.13: Pipe Slope Drain.

Size the pipe to convey the projected flow. The capacity for temporary drains shall be sufficient to handle flows calculated by one of the following methods:

- Single Event Hydrograph Method: The peak volumetric flow rate calculated using a 10-minute time step from a Type 1A, 10-year, 24-hour frequency storm for the worst-case land cover

condition.

OR

- Continuous Simulation Method: The 10-year peak flow rate, as determined by an approved continuous runoff model with a 15-minute time step for the worst-case land cover condition.

Worst-case land cover conditions (i.e., producing the most runoff) should be used for analysis (in most cases, this would be the land cover conditions just prior to final landscaping).

Consult local drainage requirements for sizing permanent pipe slope drains.

- Use care in clearing vegetated slopes for installation.
- Re-establish cover immediately on areas disturbed by installation.
- Use temporary drains on new cut or fill slopes.
- Use BMP C200: Interceptor Dike and Swale to collect water at the top of the slope.
- Ensure that the entrance area is stable and large enough to direct flow into the pipe.
- Piping of water through the berm at the entrance area is a common failure mode.
- The entrance shall consist of a standard flared end section for culverts 12 inches and larger with a minimum 6-inch metal toe plate to prevent runoff from undercutting the pipe inlet. The slope of the entrance shall be at least 3 percent. Sand bags may also be used at pipe entrances as a temporary measure.
- The soil around and under the pipe and entrance section shall be thoroughly compacted to prevent undercutting.
- The flared inlet section shall be securely connected to the slope drain and have watertight connecting bands.
- Slope drain sections shall be securely fastened together, fused or have gasketed watertight fittings, and shall be securely anchored into the soil.
- Thrust blocks should be installed anytime 90 degree bends are utilized. Depending on size of pipe and flow, these can be constructed with sand bags, straw bales staked in place, “t” posts and wire, or ecology blocks.
- Pipe needs to be secured along its full length to prevent movement. This can be done with steel “t” posts and wire. Install a post on each side of the pipe and wire the pipe to them. This should be done every 10-20 feet of pipe length or so, depending on the size of the pipe and quantity of water to divert.
- BMP C200: Interceptor Dike and Swale shall be used to direct runoff into a pipe slope drain. The height of the dike shall be at least 1 foot higher at all points than the top of the inlet pipe.
- The area below the outlet must be stabilized. See BMP C209: Outlet Protection.
- If the pipe slope drain is conveying sediment-laden water, direct all flows into a sediment trap-

ping facility.

- Materials specifications for any permanent piped system shall be set by the local government.

Maintenance Standards

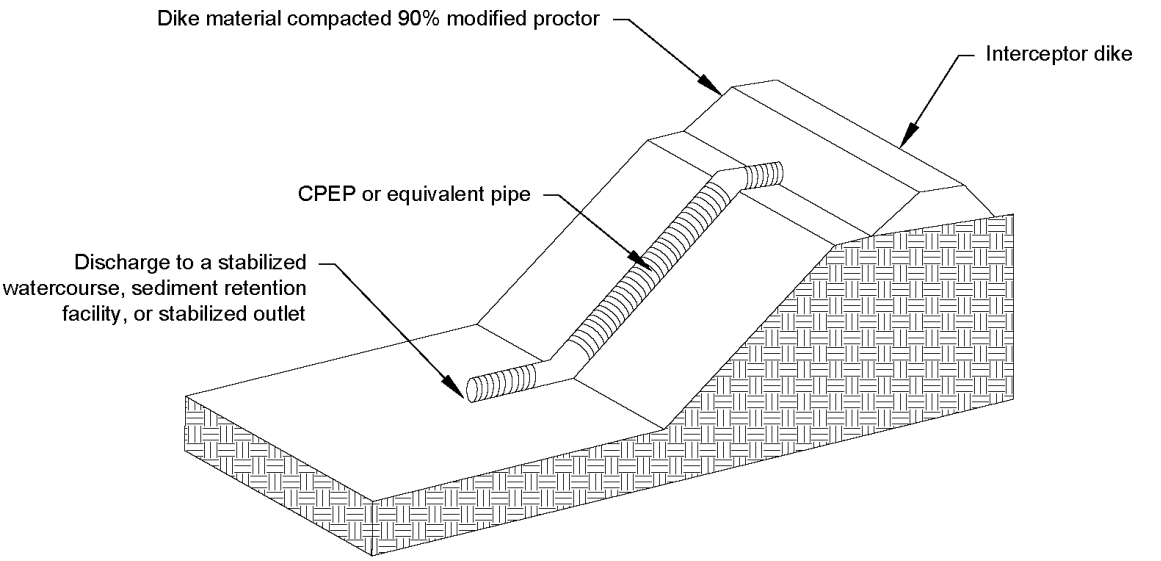
Check inlet and outlet points regularly, especially after storms.

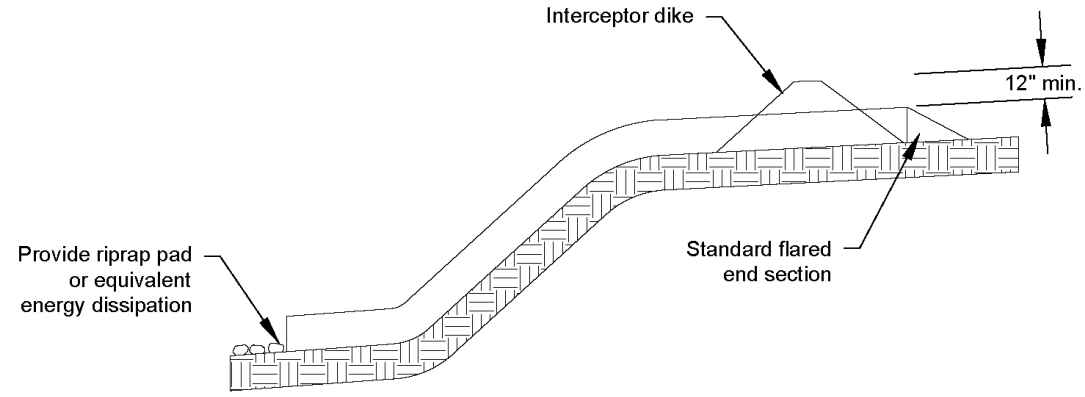
- The inlet should be free of undercutting, and no water should be going around the point of entry. If there are problems, the headwall should be reinforced with compacted earth or sand bags.
- The outlet point should be free of erosion and installed with appropriate outlet protection.

For permanent installations, inspect the pipe periodically for vandalism and physical distress such as slides and wind-throw. Clean the pipe and outlet structure at the completion of construction.

Normally the pipe slope is so steep that clogging is not a problem with smooth wall pipe, however, debris may become lodged in the pipe.

Figure II-3.13: Pipe Slope Drain





Notes:

1. Inlet and all sections must be securely fastened together with gasketed watertight fittings

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State of Washington

Pipe Slope Drain

Revised June 2016

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BMP C207: Check Dams

Purpose

Construction of check dams across a swale or ditch reduces the velocity of concentrated flow and dissipates energy at the check dam.

Conditions of Use

Use check dams where temporary or permanent channels are not yet vegetated, channel lining is infeasible, and/or velocity checks are required.

- Check dams may not be placed in streams unless approved by the State Department of Fish and Wildlife.
- Check dams may not be placed in wetlands without approval from a permitting agency.
- Do not place check dams below the expected backwater from any salmonid bearing water between October 1 and May 31 to ensure that there is no loss of high flow refuge habitat for overwintering juvenile salmonids and emergent salmonid fry.

Design and Installation Specifications

- Construct rock check dams from appropriately sized rock. The rock used must be large enough to stay in place given the expected design flow through the channel. The rock must be placed by hand or by mechanical means (do not dump the rock to form the dam) to achieve complete coverage of the ditch or swale and to ensure that the center of the dam is lower than the edges.
- Check dams may also be constructed of either rock or pea-gravel filled bags. Numerous new products are also available for this purpose. They tend to be re-usable, quick and easy to install, effective, and cost efficient.
- Place check dams perpendicular to the flow of water.
- The check dam should form a triangle when viewed from the side. This prevents undercutting as water flows over the face of the check dam rather than falling directly onto the ditch bottom.
- Before installing check dams, impound and bypass upstream water flow away from the work area. Options for bypassing include pumps, siphons, or temporary channels.
- Check dams combined with sumps work more effectively at slowing flow and retaining sediment than a check dam alone. A deep sump should be provided immediately upstream of the check dam.
- In some cases, if carefully located and designed, check dams can remain as permanent installations with very minor regrading. They may be left as either spillways, in which case accumulated sediment would be graded and seeded, or as check dams to prevent further sediment from leaving the site.
- The maximum spacing between check dams shall be such that the downstream toe of the

upstream dam is at the same elevation as the top of the downstream dam.

- Keep the maximum height at 2 feet at the center of the check dam.
- Keep the center of the check dam at least 12 inches lower than the outer edges at natural ground elevation.
- Keep the side slopes of the check dam at 2H:1V or flatter.
- Key the stone into the ditch banks and extend it beyond the abutments a minimum of 18 inches to avoid washouts from overflow around the dam.
- Use filter fabric foundation under a rock or sand bag check dam. If a blanket ditch liner is used, filter fabric is not necessary. A piece of organic or synthetic blanket cut to fit will also work for this purpose.
- In the case of grass-lined ditches and swales, all check dams and accumulated sediment shall be removed when the grass has matured sufficiently to protect the ditch or swale - unless the slope of the swale is greater than 4 percent. The area beneath the check dams shall be seeded and mulched immediately after dam removal.
- Ensure that channel appurtenances, such as culvert entrances below check dams, are not subject to damage or blockage from displaced stones.
- See Figure II-3.16: Rock Check Dam.

Maintenance Standards

Check dams shall be monitored for performance and sediment accumulation during and after each rainfall that produces runoff. Sediment shall be removed when it reaches one half the sump depth.

- Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam.
- If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel. See BMP C202: Riprap Channel Lining.

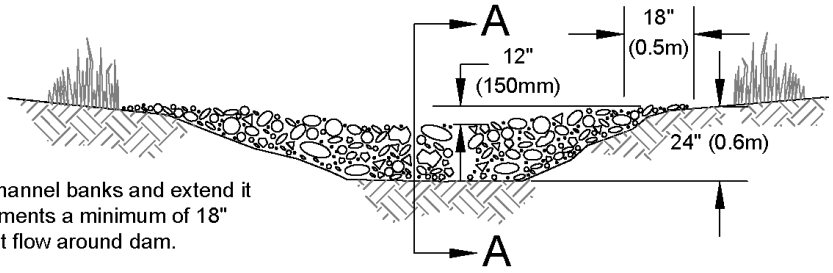
Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies

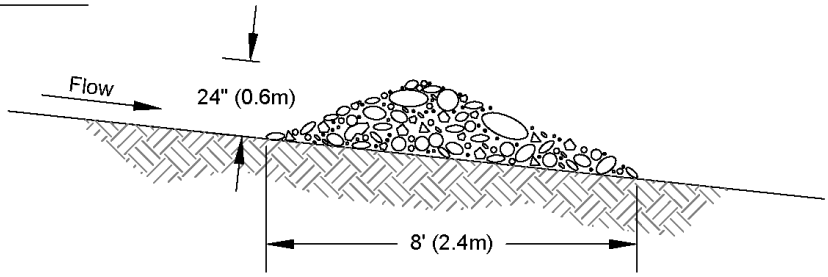
Figure II-3.16: Rock Check Dam

View Looking Upstream

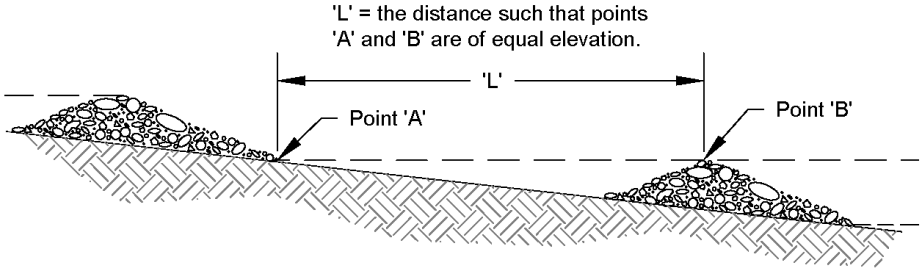


Note:
Key stone into channel banks and extend it beyond the abutments a minimum of 18" (0.5m) to prevent flow around dam.

Section A-A



Spacing Between Check Dams



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State of Washington

Rock Check Dam

Revised June 2016

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BMP C208: Triangular Silt Dike (TSD)

Purpose

Triangular silt dikes (TSDs) may be used as check dams, for perimeter protection, for temporary soil stockpile protection, for drop inlet protection, or as a temporary interceptor dike.

Conditions of Use

- TSDs may be used on soil or pavement with adhesive or staples.
- TSDs have been used to build temporary:
    - BMP C241: Sediment Pond (Temporary);
    - BMP C200: Interceptor Dike and Swale;
    - BMP C154: Concrete Washout Area;
    - BMP C203: Water Bars;
    - BMP C206: Level Spreader;
    - BMP C220: Inlet Protection;
    - BMP C207: Check Dams
    - curbing; and
    - berms.

Design and Installation Specifications

- TSDs are made of urethane foam sewn into a woven geosynthetic fabric.
- TSDs are triangular, 10 inches to 14 inches high in the center, with a 20-inch to 28-inch base. A 2 foot apron extends beyond both sides of the triangle along its standard section of 7 feet. A sleeve at one end allows attachment of additional sections as needed.
- Install with ends curved up to prevent water from flowing around the ends.
- The fabric flaps and check dam units are attached to the ground with wire staples. Wire staples should be No. 11 gauge wire and should be 200 mm to 300 mm in length.
- When multiple units are installed, the sleeve of fabric at the end of the unit shall overlap the abutting unit and be stapled.
- When used as check dams:
    - TSDs should be located and installed as soon as construction will allow.
    - TSDs should be placed perpendicular to the flow of water.
    - The leading edge of the TSD must be secured with rocks, sandbags, or a small key slot

and staples.

- In the case of grass-lined ditches and swales, check dams and accumulated sediment shall be removed when the grass has matured sufficiently to protect the ditch or swale unless the slope of the swale is greater than 4 percent. The area beneath the check dams shall be seeded and mulched immediately after dam removal.

Maintenance Standards

- Inspect TSDs for performance and sediment accumulation during and after each rainfall that produces runoff. Remove sediment when it reaches one half the height of the TSD.
- Anticipate submergence and deposition above the TSD and erosion from high flows around the edges of the TSD. Immediately repair any damage or any undercutting of the TSD.

BMP C209: Outlet Protection

Purpose

Outlet protection prevents scour at conveyance outlets and minimizes the potential for downstream erosion by reducing the velocity of concentrated stormwater flows.

Conditions of Use

Use outlet protection at the outlets of all ponds, pipes, ditches, or other conveyances that discharge to a natural or manmade drainage feature such as a stream, wetland, lake, or ditch.

Design and Installation Specifications

- The receiving channel at the outlet of a pipe shall be protected from erosion by lining a minimum of 6 feet downstream and extending up the channel sides a minimum of 1–foot above the maximum tailwater elevation, or 1-foot above the crown, whichever is higher. For pipes larger than 18 inches in diameter, the outlet protection lining of the channel shall be four times the diameter of the outlet pipe.
- Standard wingwalls, tapered outlets, and paved channels should also be considered when appropriate for permanent culvert outlet protection (WSDOT, 2015).
- BMP C122: Nets and Blankets or BMP C202: Riprap Channel Lining provide suitable options for lining materials.
- With low flows, BMP C201: Grass-Lined Channels can be an effective alternative for lining material.
- The following guidelines shall be used for outlet protection with riprap:
    - If the discharge velocity at the outlet is less than 5 fps, use 2-inch to 8-inch riprap. Minimum thickness is 1-foot.
    - For 5 to 10 fps discharge velocity at the outlet, use 24-inch to 48-inch riprap. Minimum

thickness is 2 feet.

- For outlets at the base of steep slope pipes (pipe slope greater than 10 percent), use an engineered energy dissipator.
- Filter fabric or erosion control blankets should always be used under riprap to prevent scour and channel erosion. See BMP C122: Nets and Blankets.

- Bank stabilization, bioengineering, and habitat features may be required for disturbed areas. This work may require a Hydraulic Project Approval (HPA) from the Washington State Department of Fish and Wildlife. See I-2.11 Hydraulic Project Approvals.

Maintenance Standards

- Inspect and repair as needed.
- Add rock as needed to maintain the intended function.
- Clean energy dissipator if sediment builds up.

BMP C220: Inlet Protection

Purpose

Inlet protection prevents coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.

Conditions of Use

Use inlet protection at inlets that are operational before permanent stabilization of the disturbed areas that contribute runoff to the inlet. Provide protection for all storm drain inlets downslope and within 500 feet of a disturbed or construction area, unless those inlets are preceded by a sediment trapping BMP.

Also consider inlet protection for lawn and yard drains on new home construction. These small and numerous drains coupled with lack of gutters can add significant amounts of sediment into the roof drain system. If possible, delay installing lawn and yard drains until just before landscaping, or cap these drains to prevent sediment from entering the system until completion of landscaping. Provide 18-inches of sod around each finished lawn and yard drain.

Table II-3.10: Storm Drain Inlet Protection lists several options for inlet protection. All of the methods for inlet protection tend to plug and require a high frequency of maintenance. Limit contributing drainage areas for an individual inlet to one acre or less. If possible, provide emergency overflows with additional end-of-pipe treatment where stormwater ponding would cause a hazard.

Table II-3.10: Storm Drain Inlet Protection

Type of Inlet Protection	Emergency Overflow	Applicable for Paved/ Earthen Surfaces	Conditions of Use
Drop Inlet Protection			
Excavated drop inlet protection	Yes, temporary flooding may occur	Earthen	Applicable for heavy flows. Easy to maintain. Large area requirement: 30'x30'/acre
Block and gravel drop inlet protection	Yes	Paved or Earthen	Applicable for heavy concentrated flows. Will not pond.
Gravel and wire drop inlet protection	No	Paved or Earthen	Applicable for heavy concentrated flows. Will pond. Can withstand traffic.
Catch basin filters	Yes	Paved or Earthen	Frequent maintenance required.
Curb Inlet Protection			
Curb inlet protection with wooden weir	Small capacity overflow	Paved	Used for sturdy, more compact installation.
Block and gravel curb inlet protection	Yes	Paved	Sturdy, but limited filtration.
Culvert Inlet Protection			
Culvert inlet sediment trap	N/A	N/A	18 month expected life.

Design and Installation Specifications

Excavated Drop Inlet Protection

Excavated drop inlet protection consists of an excavated impoundment around the storm drain inlet. Sediment settles out of the stormwater prior to entering the storm drain. Design and installation specifications for excavated drop inlet protection include:

- Provide a depth of 1-2 ft as measured from the crest of the inlet structure.
- Slope sides of excavation should be no steeper than 2H:1V.
- Minimum volume of excavation is 35 cubic yards.
- Shape the excavation to fit the site, with the longest dimension oriented toward the longest inflow area.
- Install provisions for draining to prevent standing water.
- Clear the area of all debris.

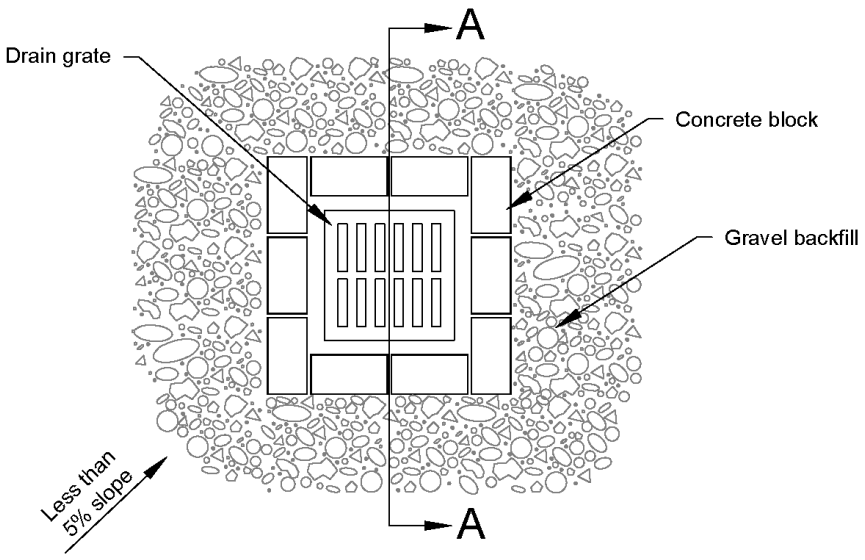
- Grade the approach to the inlet uniformly.
- Drill weep holes into the side of the inlet.
- Protect weep holes with screen wire and washed aggregate.
- Seal weep holes when removing structure and stabilizing area.
- Build a temporary dike, if necessary, to the down slope side of the structure to prevent bypass flow.

Block and Gravel Filter

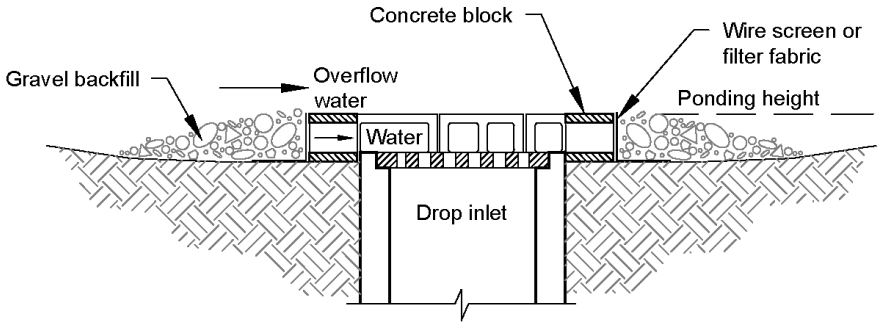
A block and gravel filter is a barrier formed around the inlet with standard concrete blocks and gravel. See Figure II-3.17: Block and Gravel Filter. Design and installation specifications for block gravel filters include:

- Provide a height of 1 to 2 feet above the inlet.
- Recess the first row of blocks 2-inches into the ground for stability.
- Support subsequent courses by placing a pressure treated wood 2x4 through the block opening.
- Do not use mortar.
- Lay some blocks in the bottom row on their side to allow for dewatering the pool.
- Place hardware cloth or comparable wire mesh with ½-inch openings over all block openings.
- Place gravel to just below the top of blocks on slopes of 2H:1V or flatter.
- An alternative design is a gravel berm surrounding the inlet, as follows:
    - Provide a slope of 3H:1V on the upstream side of the berm.
    - Provide a slope of 2H:1V on the downstream side of the berm.
    - Provide a 1-foot wide level stone area between the gravel berm and the inlet.
    - Use stones 3 inches in diameter or larger on the upstream slope of the berm.
    - Use gravel ½- to ¾-inch at a minimum thickness of 1-foot on the downstream slope of the berm.

Figure II-3.17: Block and Gravel Filter



Plan View



Section A-A

Notes:

1. Drop inlet sediment barriers are to be used for small, nearly level drainage areas. (less than 5%)
2. Excavate a basin of sufficient size adjacent to the drop inlet.
3. The top of the structure (ponding height) must be well below the ground elevation downslope to prevent runoff from bypassing the inlet. A temporary dike may be necessary on the downslope side of the structure.

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DEPARTMENT OF ECOLOGY
State of Washington

Block and Gravel Filter

Revised June 2016

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Gravel and Wire Mesh Filter

Gravel and wire mesh filters are gravel barriers placed over the top of the inlet. This method does not provide an overflow. Design and installation specifications for gravel and wire mesh filters include:

- Use a hardware cloth or comparable wire mesh with ½-inch openings.
    - Place wire mesh over the drop inlet so that the wire extends a minimum of 1-foot beyond each side of the inlet structure.
    - Overlap the strips if more than one strip of mesh is necessary.
- Place coarse aggregate over the wire mesh.
    - Provide at least a 12-inch depth of aggregate over the entire inlet opening and extend at least 18-inches on all sides.

Catch Basin Filters

Catch basin filters are designed by manufacturers for construction sites. The limited sediment storage capacity increases the amount of inspection and maintenance required, which may be daily for heavy sediment loads. To reduce maintenance requirements, combine a catch basin filter with another type of inlet protection. This type of inlet protection provides flow bypass without overflow and therefore may be a better method for inlets located along active rights-of-way. Design and installation specifications for catch basin filters include:

- Provides 5 cubic feet of storage.
- Requires dewatering provisions.
- Provides a high-flow bypass that will not clog under normal use at a construction site.
- Insert the catch basin filter in the catch basin just below the grating.

Curb Inlet Protection with Wooden Weir

Curb inlet protection with wooden weir is an option that consists of a barrier formed around a curb inlet with a wooden frame and gravel. Design and installation specifications for curb inlet protection with wooden weirs include:

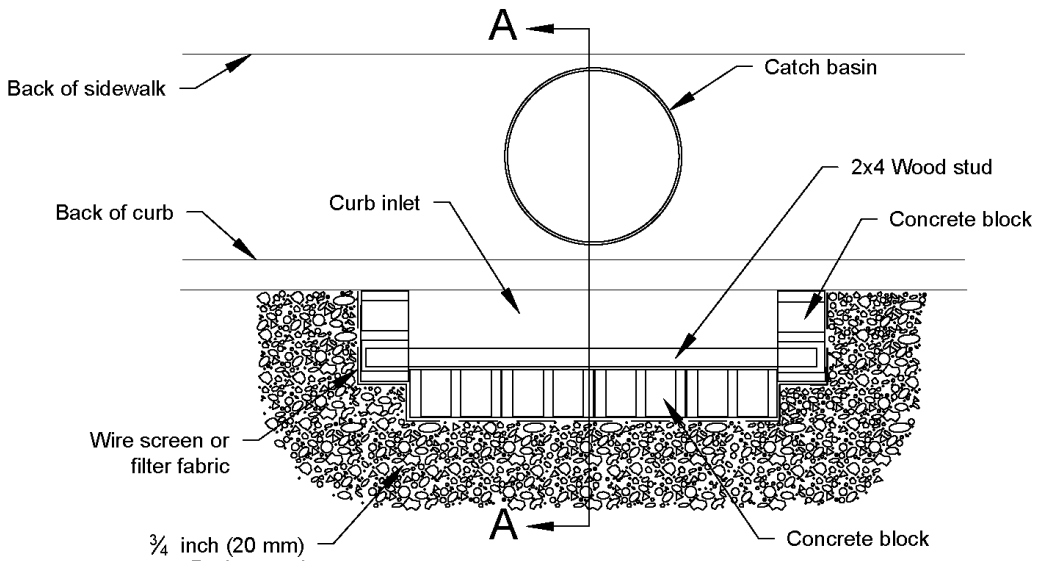
- Use wire mesh with ½-inch openings.
- Use extra strength filter cloth.
- Construct a frame.
- Attach the wire and filter fabric to the frame.
- Pile coarse washed aggregate against the wire and fabric.
- Place weight on the frame anchors.

Block and Gravel Curb Inlet Protection

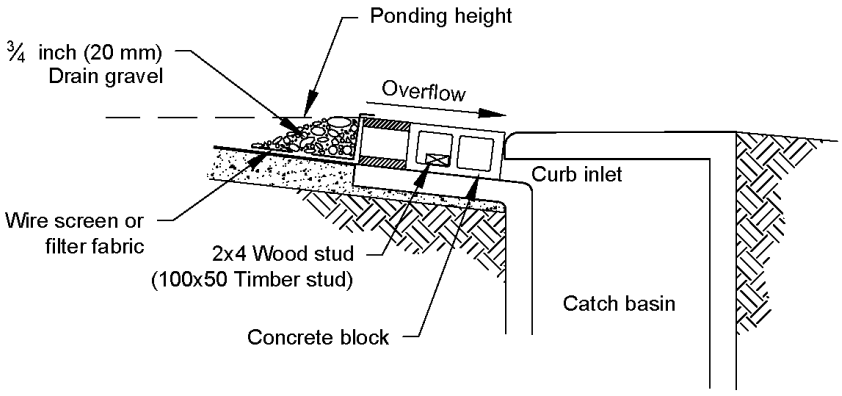
Block and gravel curb inlet protection is a barrier formed around a curb inlet with concrete blocks and gravel. See Figure II-3.18: Block and Gravel Curb Inlet Protection. Design and installation specifications for block and gravel curb inlet protection include:

- Use wire mesh with ½-inch openings.
- Place two concrete blocks on their sides abutting the curb at either side of the inlet opening. These are spacer blocks.
- Place a 2x4 stud through the outer holes of each spacer block to align the front blocks.
- Place blocks on their sides across the front of the inlet and abutting the spacer blocks.
- Place wire mesh over the outside vertical face.
- Pile coarse aggregate against the wire to the top of the barrier.

Figure II-3.18: Block and Gravel Curb Inlet Protection



Plan View



Section A-A

Notes:

1. Use block and gravel type sediment barrier when curb inlet is located in gently sloping street segment, where water can pond and allow sediment to separate from runoff.
2. Barrier shall allow for overflow from severe storm event.
3. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

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Block and Gravel Curb Inlet Protection

Revised June 2016

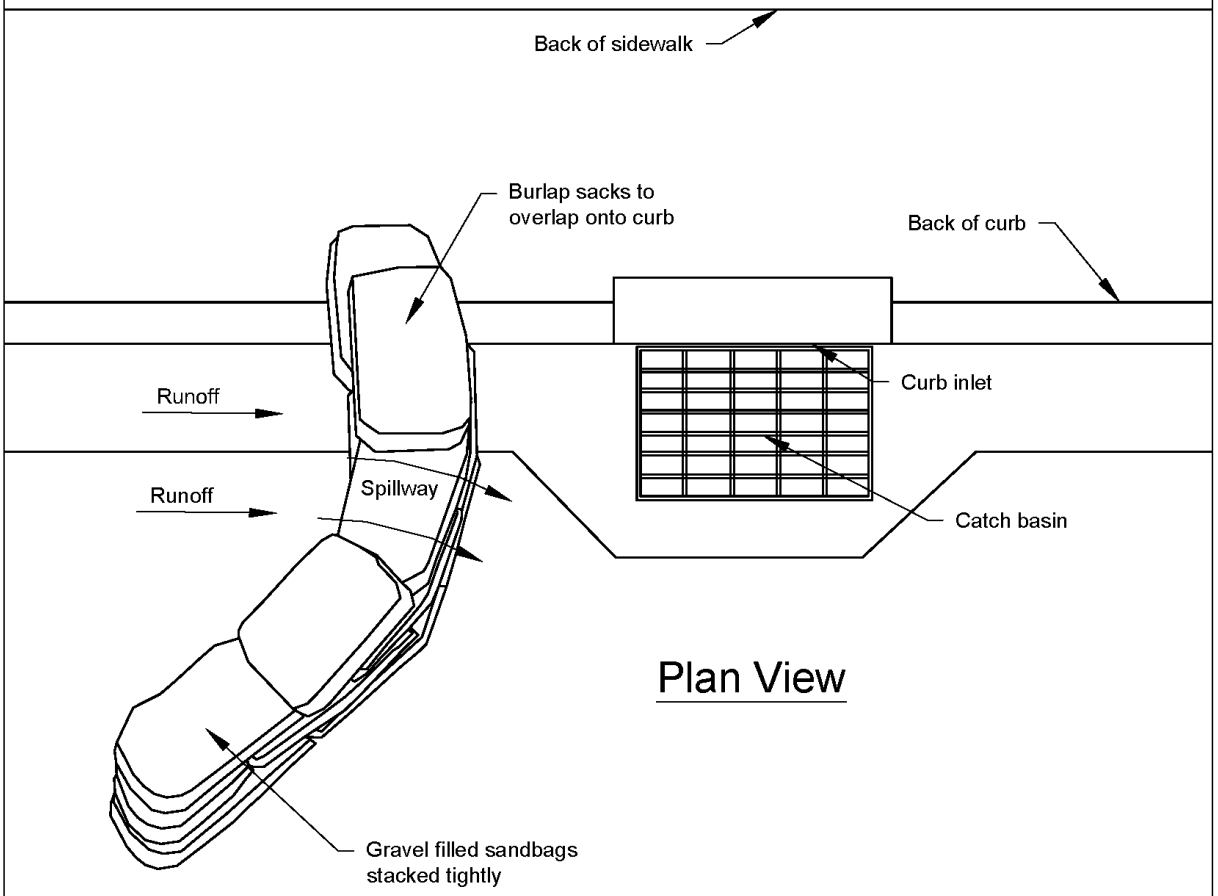
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Curb and Gutter Sediment Barrier

Curb and gutter sediment barrier is a sandbag or rock berm (riprap and aggregate) 3 feet high and 3 feet wide in a horseshoe shape. See Figure II-3.19: Curb and Gutter Barrier. Design and installation specifications for curb and gutter sediment barrier include:

- Construct a horseshoe shaped berm, faced with coarse aggregate if using riprap, 3 feet high and 3 feet wide, at least 2 feet from the inlet.
- Construct a horseshoe shaped sedimentation trap on the upstream side of the berm. Size the trap to sediment trap standards for protecting a culvert inlet.

Figure II-3.19: Curb and Gutter Barrier



Notes:

1. Place curb type sediment barriers on gently sloping street segments, where water can pond and allow sediment to separate from runoff.
2. Sandbags of either burlap or woven 'geotextile' fabric, are filled with gravel, layered and packed tightly.
3. Leave a one sandbag gap in the top row to provide a spillway for overflow.
4. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

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Curb and Gutter Barrier

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BMP C233: Silt Fence

Purpose

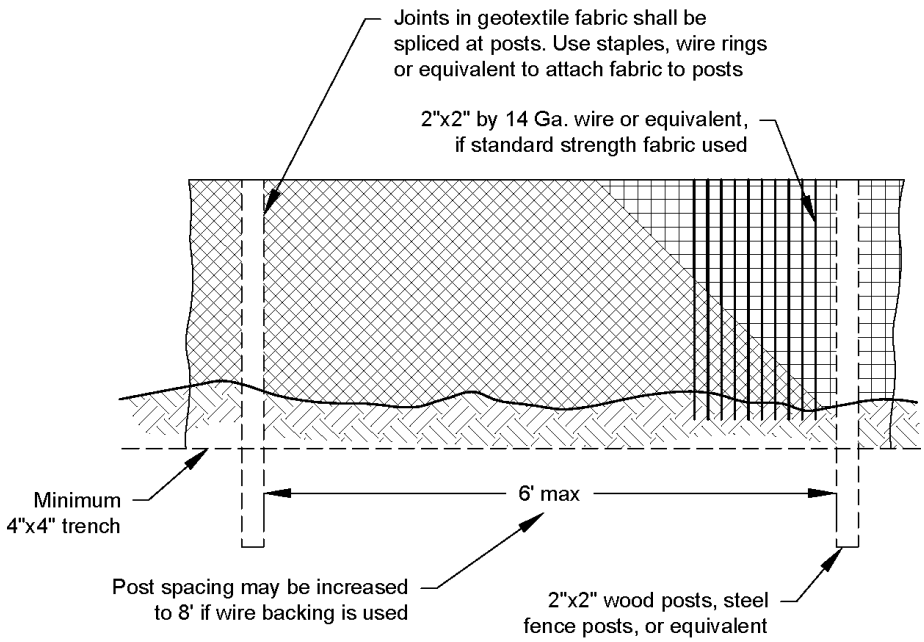
Silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.

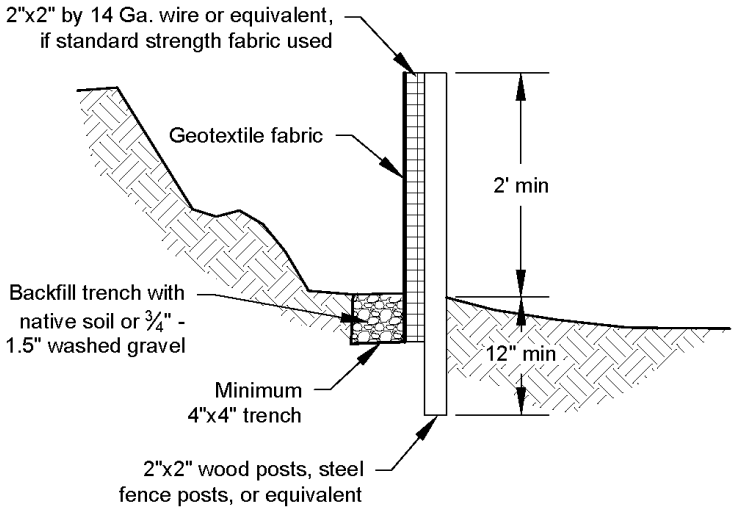
Conditions of Use

Silt fence may be used downslope of all disturbed areas.

- Silt fence shall prevent sediment carried by runoff from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Convey any concentrated flows through the drainage system to a sediment trapping BMP.
- Do not construct silt fences in streams or use in V-shaped ditches. Silt fences do not provide an adequate method of silt control for anything deeper than sheet or overland flow.

Figure II-3.22: Silt Fence





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Silt Fence

Revised July 2017

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Design and Installation Specifications

- Use in combination with other construction stormwater BMPs.
- Maximum slope steepness (perpendicular to the silt fence line) 1H:1V.
- Maximum sheet or overland flow path length to the silt fence of 100 feet.
- Do not allow flows greater than 0.5 cfs.
- Use geotextile fabric that meets the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table II-3.11: Geotextile Fabric Standards for Silt Fence):

Table II-3.11: Geotextile Fabric Standards for Silt Fence

Geotextile Property	Minimum Average Roll Value
Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film woven (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec^{-1} minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. Minimum for extra strength fabric. 100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Support standard strength geotextiles with wire mesh, chicken wire, 2-inch x 2-inch wire, safety fence, or jute mesh to increase the strength of the geotextile. Silt fence materials are available that have synthetic mesh backing attached.
- Silt fence material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0°F to 120°F.
- One-hundred percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by the local jurisdiction.
- Refer to Figure II-3.22: Silt Fence for standard silt fence details. Include the following Standard Notes for silt fence on construction plans and specifications:

    1. The Contractor shall install and maintain temporary silt fences at the locations shown in the Plans.
    2. Construct silt fences in areas of clearing, grading, or drainage prior to starting those activities.

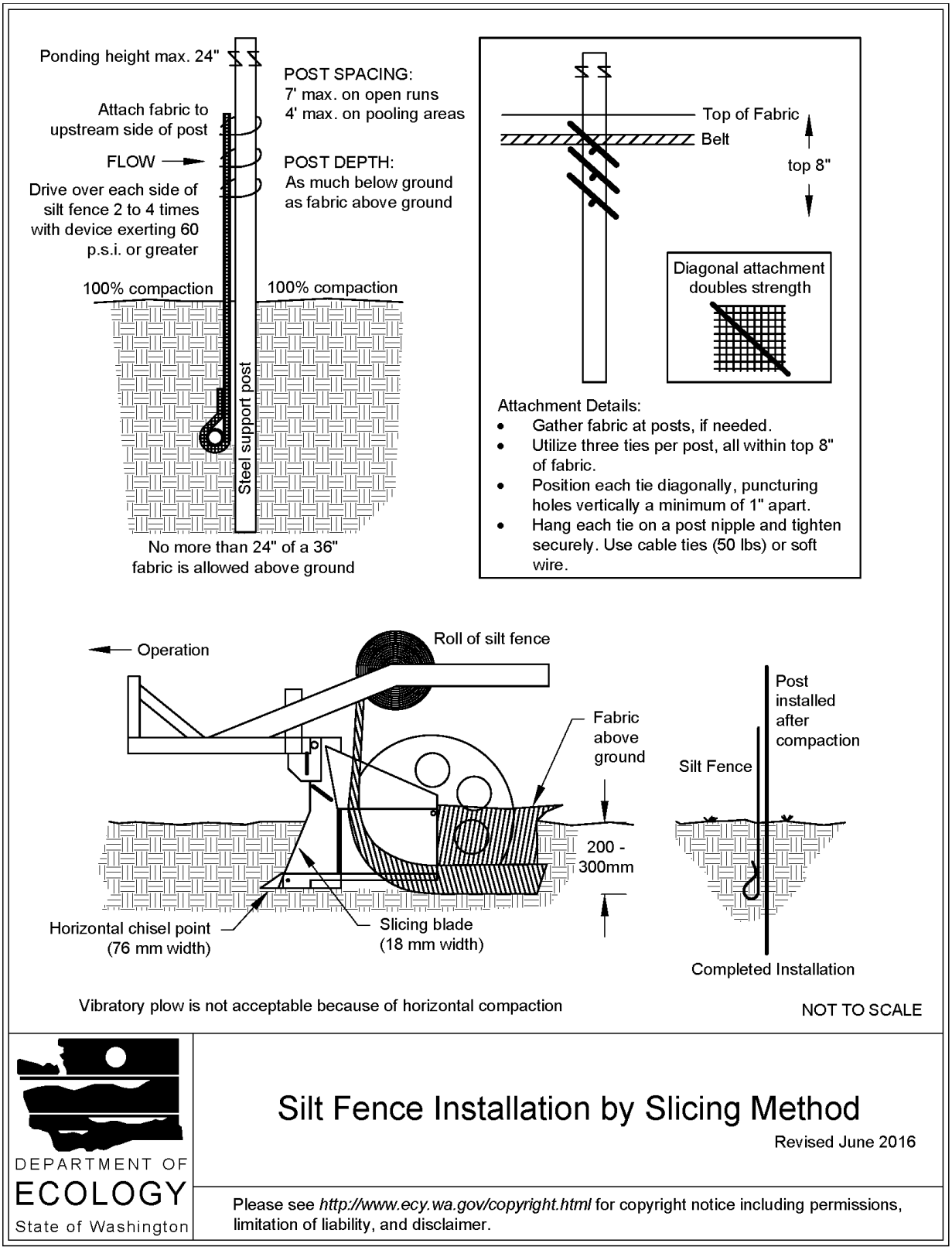
3. The silt fence shall have a 2-feet min. and a 2½-feet max. height above the original ground surface.
4. The geotextile fabric shall be sewn together at the point of manufacture to form fabric lengths as required. Locate all sewn seams at support posts. Alternatively, two sections of silt fence can be overlapped, provided that the overlap is long enough and that the adjacent silt fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.
5. Attach the geotextile fabric on the up-slope side of the posts and secure with staples, wire, or in accordance with the manufacturer's recommendations. Attach the geotextile fabric to the posts in a manner that reduces the potential for tearing.
6. Support the geotextile fabric with wire or plastic mesh, dependent on the properties of the geotextile selected for use. If wire or plastic mesh is used, fasten the mesh securely to the up-slope side of the posts with the geotextile fabric up-slope of the mesh.
7. Mesh support, if used, shall consist of steel wire with a maximum mesh spacing of 2-inches, or a prefabricated polymeric mesh. The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs. grab tensile strength. The polymeric mesh must be as resistant to the same level of ultraviolet radiation as the geotextile fabric it supports.
8. Bury the bottom of the geotextile fabric 4-inches min. below the ground surface. Backfill and tamp soil in place over the buried portion of the geotextile fabric, so that no flow can pass beneath the silt fence and scouring cannot occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the ground 3-inches min.
9. Drive or place the silt fence posts into the ground 18-inches min. A 12–inch min. depth is allowed if topsoil or other soft subgrade soil is not present and 18-inches cannot be reached. Increase fence post min. depths by 6 inches if the fence is located on slopes of 3H:1V or steeper and the slope is perpendicular to the fence. If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.
10. Use wood, steel or equivalent posts. The spacing of the support posts shall be a maximum of 6-feet. Posts shall consist of either:
    - Wood with minimum dimensions of 2 inches by 2 inches by 3 feet. Wood shall be free of defects such as knots, splits, or gouges.
    - No. 6 steel rebar or larger.
    - ASTM A 120 steel pipe with a minimum diameter of 1-inch.
    - U, T, L, or C shape steel posts with a minimum weight of 1.35 lbs./ft.
    - Other steel posts having equivalent strength and bending resistance to the post sizes listed above.
11. Locate silt fences on contour as much as possible, except at the ends of the fence,

where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.

12. If the fence must cross contours, with the exception of the ends of the fence, place check dams perpendicular to the back of the fence to minimize concentrated flow and erosion. The slope of the fence line where contours must be crossed shall not be steeper than 3H:1V.
    - Check dams shall be approximately 1-foot deep at the back of the fence. Check dams shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence.
    - Check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. Check dams shall be located every 10 feet along the fence where the fence must cross contours.

- Refer to Figure II-3.23: Silt Fence Installation by Slicing Method for slicing method details. The following are specifications for silt fence installation using the slicing method:
    1. The base of both end posts must be at least 2- to 4-inches above the top of the geotextile fabric on the middle posts for ditch checks to drain properly. Use a hand level or string level, if necessary, to mark base points before installation.
    2. Install posts 3- to 4-feet apart in critical retention areas and 6- to 7-feet apart in standard applications.
    3. Install posts 24-inches deep on the downstream side of the silt fence, and as close as possible to the geotextile fabric, enabling posts to support the geotextile fabric from upstream water pressure.
    4. Install posts with the nipples facing away from the geotextile fabric.
    5. Attach the geotextile fabric to each post with three ties, all spaced within the top 8-inches of the fabric. Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1-inch vertically apart. Each tie should be positioned to hang on a post nipple when tightening to prevent sagging.
    6. Wrap approximately 6-inches of the geotextile fabric around the end posts and secure with 3 ties.
    7. No more than 24-inches of a 36-inch geotextile fabric is allowed above ground level.
    8. Compact the soil immediately next to the geotextile fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four trips. Check and correct the silt fence installation for any deviation before compaction. Use a flat-bladed shovel to tuck the fabric deeper into the ground if necessary.

Figure II-3.23: Silt Fence Installation by Slicing Method



Maintenance Standards

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment trapping BMP.
- Check the uphill side of the silt fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence and remove the trapped sediment.
- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace geotextile fabric that has deteriorated due to ultraviolet breakdown.

BMP C234: Vegetated Strip

Purpose

Vegetated strips reduce the transport of coarse sediment from a construction site by providing a physical barrier to sediment and reducing the runoff velocities of overland flow.

Conditions of Use

- Vegetated strips may be used downslope of all disturbed areas.
- Vegetated strips are not intended to treat concentrated flows, nor are they intended to treat substantial amounts of overland flow. Any concentrated flows must be conveyed through the drainage system to BMP C241: Sediment Pond (Temporary) or other sediment trapping BMP. The only circumstance in which overland flow can be treated solely by a vegetated strip, rather than by a sediment trapping BMP, is when the following criteria are met (see Table II-3.12: Contributing Drainage Area for Vegetated Strips):

Table II-3.12: Contributing Drainage Area for Vegetated Strips

Average Contributing Area Slope	Average Contributing Area Percent Slope	Max Contributing area Flowpath Length
1.5H : 1V or flatter	67% or flatter	100 feet
2H : 1V or flatter	50% or flatter	115 feet
4H : 1V or flatter	25% or flatter	150 feet
6H : 1V or flatter	16.7% or flatter	200 feet
10H : 1V or flatter	10% or flatter	250 feet

Design and Installation Specifications

- The vegetated strip shall consist of a continuous strip of dense vegetation with topsoil for a minimum of a 25-foot length along the flowpath. Grass-covered, landscaped areas are generally not adequate because the volume of sediment overwhelms the grass. Ideally, vegetated strips shall consist of undisturbed native growth with a well-developed soil that allows for infiltration of runoff.
- The slope within the vegetated strip shall not exceed 4H:1V.
- The uphill boundary of the vegetated strip shall be delineated with clearing limits.

Maintenance Standards

- Any areas damaged by erosion or construction activity shall be seeded immediately and protected by mulch.
- If more than 5 feet of the original vegetated strip width has had vegetation removed or is being eroded, sod must be installed.
- If there are indications that concentrated flows are traveling across the vegetated strip, stormwater runoff controls must be installed to reduce the flows entering the vegetated strip, or additional perimeter protection must be installed.

BMP C235: Wattles

Purpose

Wattles are temporary erosion and sediment control barriers consisting of straw, compost, or other material that is wrapped in netting made of natural plant fiber or similar encasing material. They reduce the velocity and can spread the flow of rill and sheet runoff, and can capture and retain sediment.

Conditions of Use

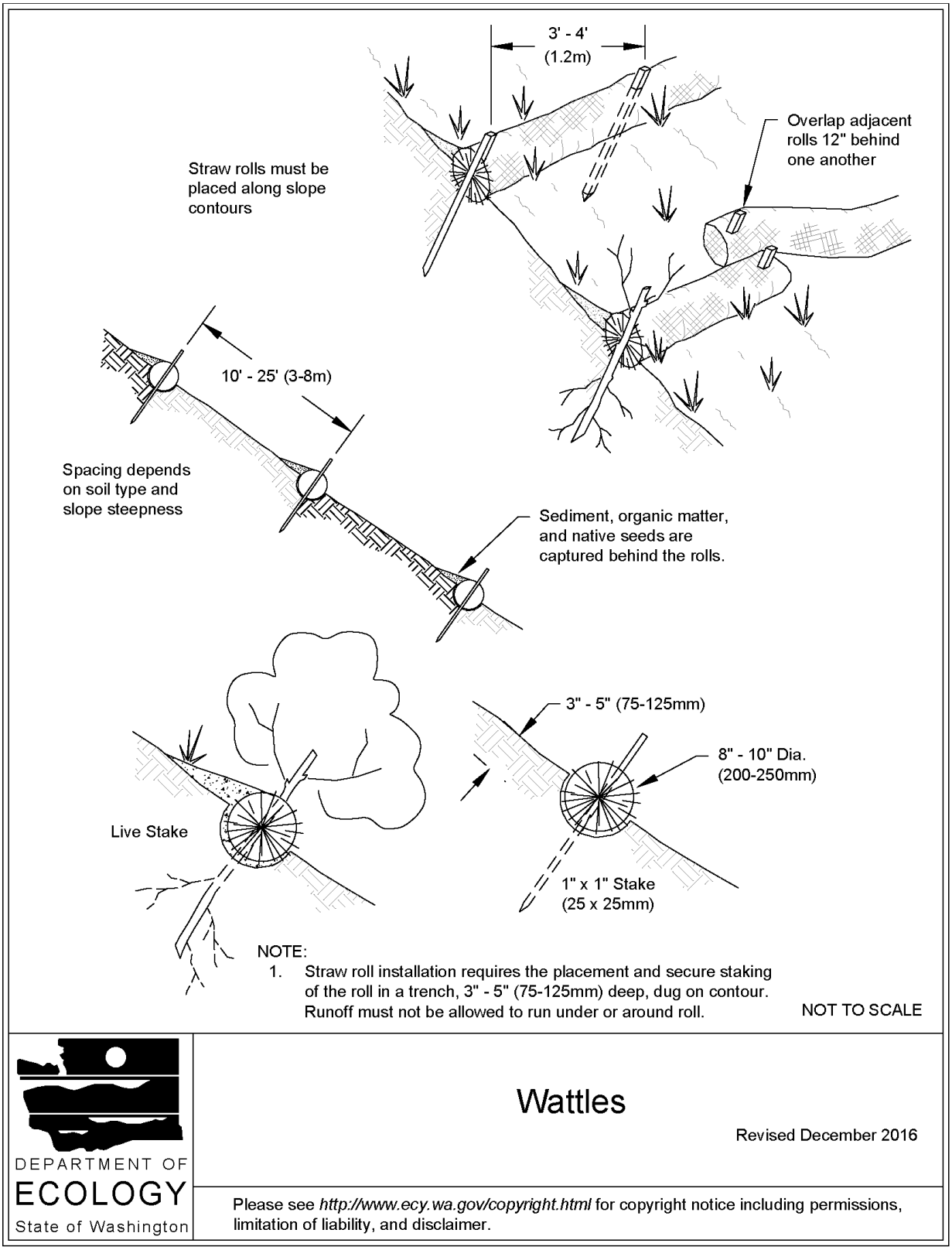
- Wattles shall consist of cylinders of plant material such as weed-free straw, coir, wood chips, excelsior, or wood fiber or shavings encased within netting made of natural plant fibers unaltered by synthetic materials.
- Use wattles:
    - In disturbed areas that require immediate erosion protection.
    - On exposed soils during the period of short construction delays, or over winter months.
    - On slopes requiring stabilization until permanent vegetation can be established.
- The material used dictates the effectiveness period of the wattle. Generally, wattles are effective for one to two seasons.

- Prevent rilling beneath wattles by entrenching and overlapping wattles to prevent water from passing between them.

Design Criteria

- See Figure II-3.24: Wattles for typical construction details.
- Wattles are typically 8 to 10 inches in diameter and 25 to 30 feet in length.
- Install wattles perpendicular to the flow direction and parallel to the slope contour.
- Place wattles in shallow trenches, staked along the contour of disturbed or newly constructed slopes. Dig narrow trenches across the slope (on contour) to a depth of 3- to 5-inches on clay soils and soils with gradual slopes. On loose soils, steep slopes, and areas with high rainfall, the trenches should be dug to a depth of 5- to 7- inches, or 1/2 to 2/3 of the thickness of the wattle.
- Start building trenches and installing wattles from the base of the slope and work up. Spread excavated material evenly along the uphill slope and compact it using hand tamping or other methods.
- Construct trenches at intervals of 10- to 25-feet depending on the steepness of the slope, soil type, and rainfall. The steeper the slope the closer together the trenches.
- Install the wattles snugly into the trenches and overlap the ends of adjacent wattles 12 inches behind one another.
- Install stakes at each end of the wattle, and at 4-foot centers along entire length of wattle.
- If required, install pilot holes for the stakes using a straight bar to drive holes through the wattle and into the soil.
- Wooden stakes should be approximately 0.75 x 0.75 x 24 inches min. Willow cuttings or 3/8-inch rebar can also be used for stakes.
- Stakes should be driven through the middle of the wattle, leaving 2 to 3 inches of the stake protruding above the wattle.

Figure II-3.24: Wattles



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Maintenance Standards

- Wattles may require maintenance to ensure they are in contact with soil and thoroughly entrenched, especially after significant rainfall on steep sandy soils.
- Inspect the slope after significant storms and repair any areas where wattles are not tightly abutted or water has scoured beneath the wattles.

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies

BMP C236: Vegetative Filtration

Purpose

Vegetative filtration as a BMP is used in conjunction with detention storage in the form of portable tanks or BMP C241: Sediment Pond (Temporary), BMP C206: Level Spreader, and a pumping system with surface intake. Vegetative filtration improves turbidity levels of stormwater discharges by filtering runoff through existing vegetation where undisturbed forest floor duff layer or established lawn with thatch layer are present. Vegetative filtration can also be used to infiltrate dewatering waste from foundations, vaults, and trenches as long as runoff does not occur.

Conditions of Use

- For every five acres of disturbed soil use one acre of grass field, farm pasture, or wooded area. Reduce or increase this area depending on project size, ground water table height, and other site conditions.
- Wetlands shall not be used for vegetative filtration.
- Do not use this BMP in areas with a high ground water table, or in areas that will have a high seasonal ground water table during the use of this BMP.
- This BMP may be less effective on soils that prevent the infiltration of the water, such as hard till.
- Using other effective source control measures throughout a construction site will prevent the generation of additional highly turbid water and may reduce the time period or area need for this BMP.
- Stop distributing water into the vegetated filtration area if standing water or erosion results.

JUMP TO A SECTION IN THE TABLE OF CONTENTS:
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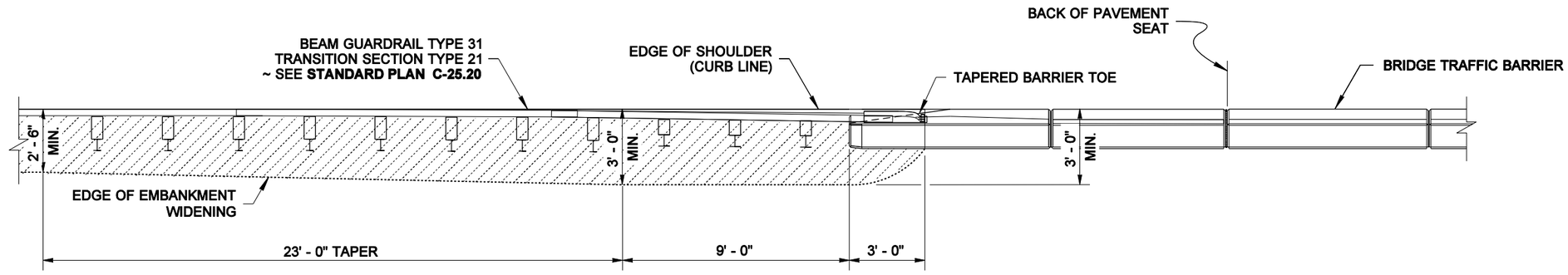
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Standard Plans

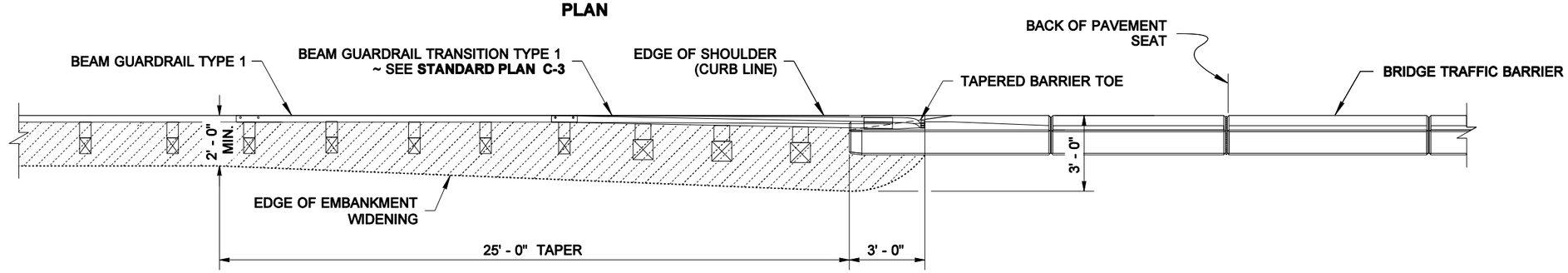
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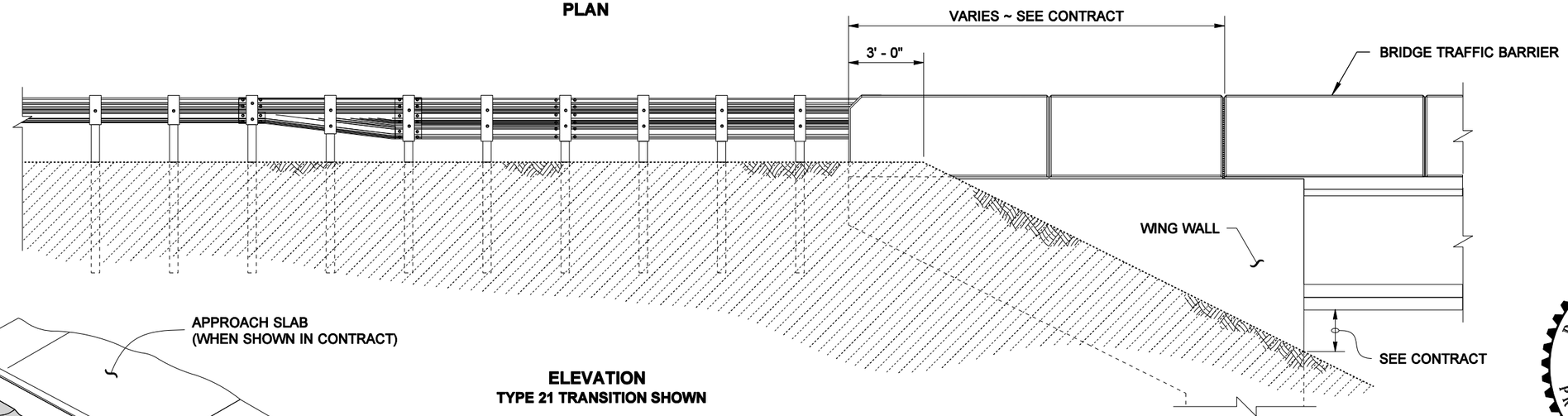
Engineering and Regional Operations
Development Division, Design Office



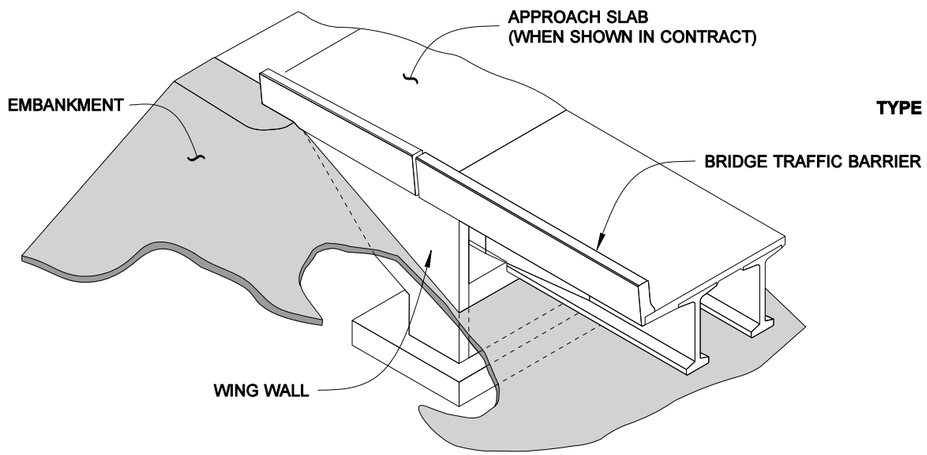
PLAN



PLAN



ELEVATION
TYPE 21 TRANSITION SHOWN



ISOMETRIC VIEW

DRAWN BY: FERN LIDDELL

BAKOTICH, PASCO III
STATE OF WASHINGTON
24557
REGISTERED
PROFESSIONAL ENGINEER

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EMBANKMENT WIDENING AT BRIDGE END WITH WING WALL STANDARD PLAN A-50.10-00

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION

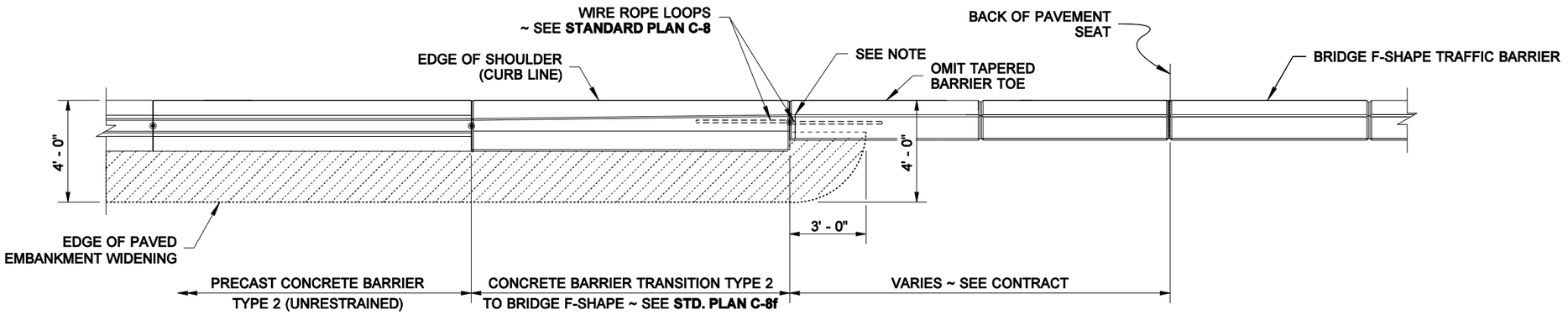
Pasco Bakotich III — STATE DESIGN ENGINEER

11-17-08 — DATE

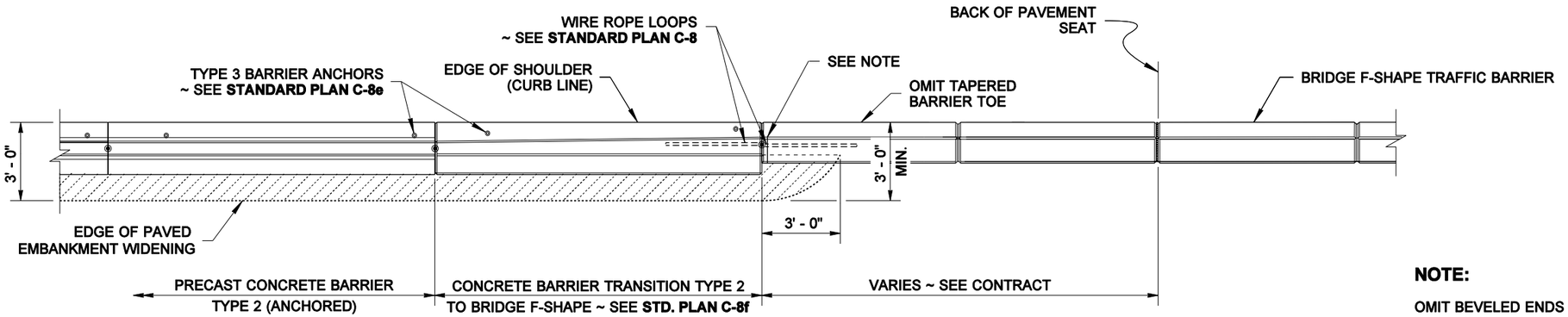
Washington State Department of Transportation

BEAM GUARDRAIL CONNECTION TO BRIDGE TRAFFIC BARRIER

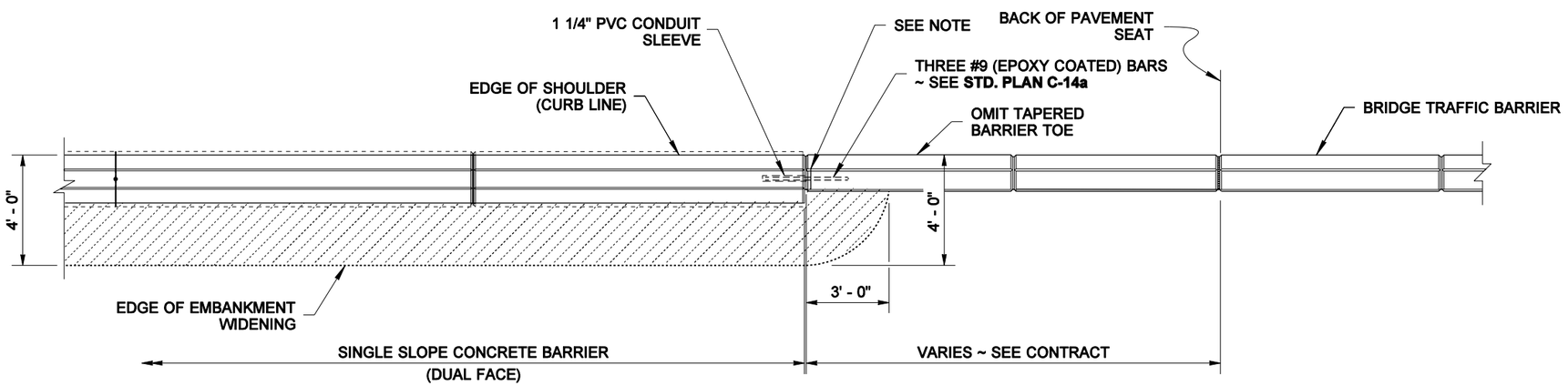
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PLAN
WITH TYPE 2 UNRESTRAINED BARRIER



PLAN
WITH ANCHORED BARRIER



PLAN
WITH SINGLE SLOPE BARRIER

CONCRETE BARRIER CONNECTION TO BRIDGE TRAFFIC BARRIER

NOTE:

OMIT BEVELED ENDS ON TOP OF BRIDGE TRAFFIC BARRIER WHEN CONNECTING TO CONCRETE BARRIERS.

BAKOTICH, PASCO III
STATE OF WASHINGTON
24557
REGISTERED
PROFESSIONAL ENGINEER

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EMBANKMENT WIDENING FOR BRIDGE END WITH WING WALL STANDARD PLAN A-50.10-00

SHEET 2 OF 2 SHEETS

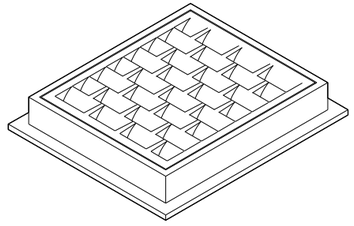
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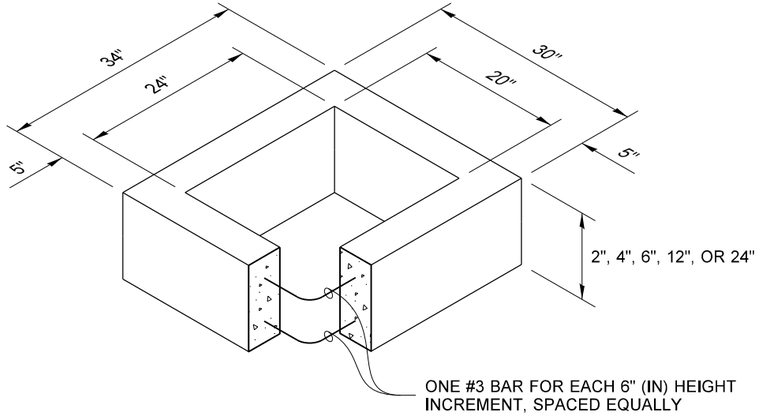
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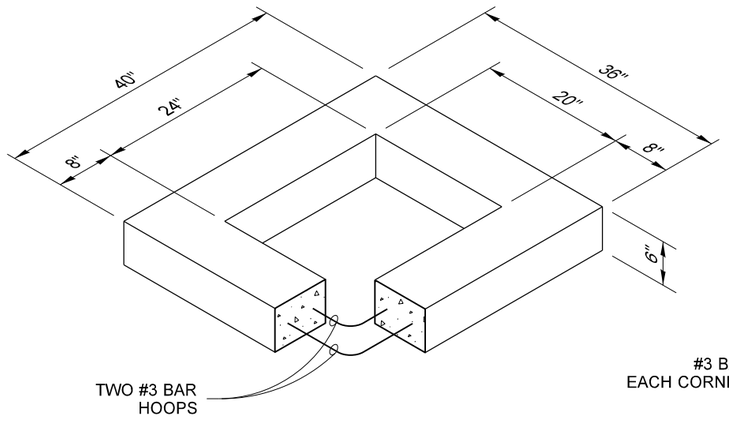
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FRAME AND VANED GRATE



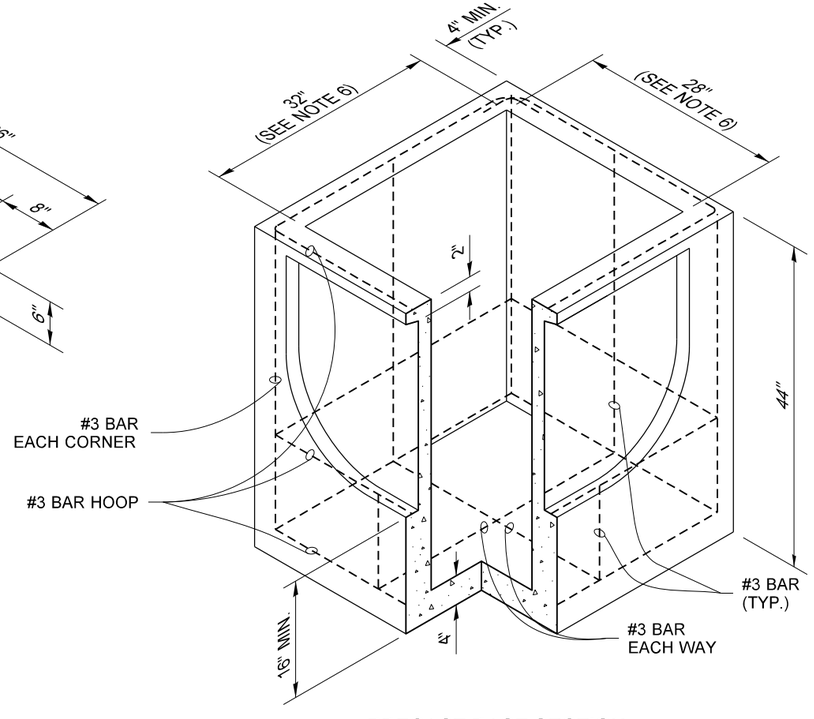
RECTANGULAR ADJUSTMENT SECTION



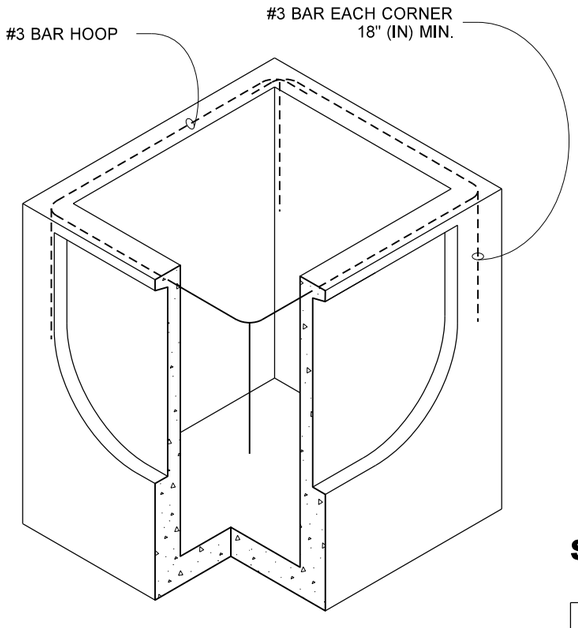
REDUCING SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	**MAXIMUM INSIDE DIAMETER (INCHES)**
REINFORCED OR PLAIN CONCRETE	18"
ALL METAL PIPE	21"
CPSSP * **(STD. SPEC. SECT. 9-05.20)**	18"
SOLID WALL PVC **(STD. SPEC. SECT. 9-05.12(1))**	21"
PROFILE WALL PVC **(STD. SPEC. SECT. 9-05.12(2))**	21"

* CORRUGATED POLYETHYLENE STORM SEWER PIPE



PRECAST BASE SECTION



(SEE NOTE 1)

ALTERNATIVE PRECAST BASE SECTION

NOTES

1. As acceptable alternatives to the rebar shown in the **PRECAST BASE SECTION**, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot, shall be used with the minimum required rebar shown in the ALTERNATIVE **PRECAST BASE SECTION**. Wire mesh shall not be placed in the knockouts.

2. The knockout shall not be greater than 26" (in), in any direction. Knockouts shall have a wall thickness of 2" (in) minimum to 2.5" (in) maximum. Provide a 1.5" (in) minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with **Standard Specification Section 9-04.3**.

3. The maximum depth from the finished grade to the lowest pipe invert shall be 5' (ft).

4. The frame and grate may be installed with the flange down or integrally cast into the adjustment section with flange up.

5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1 : 24 or steeper.

6. The opening shall be measured at the top of the Precast Base Section.

7. All pickup holes shall be grouted full after the basin has been placed.



CATCH BASIN TYPE 1L

STANDARD PLAN B-5.40-02

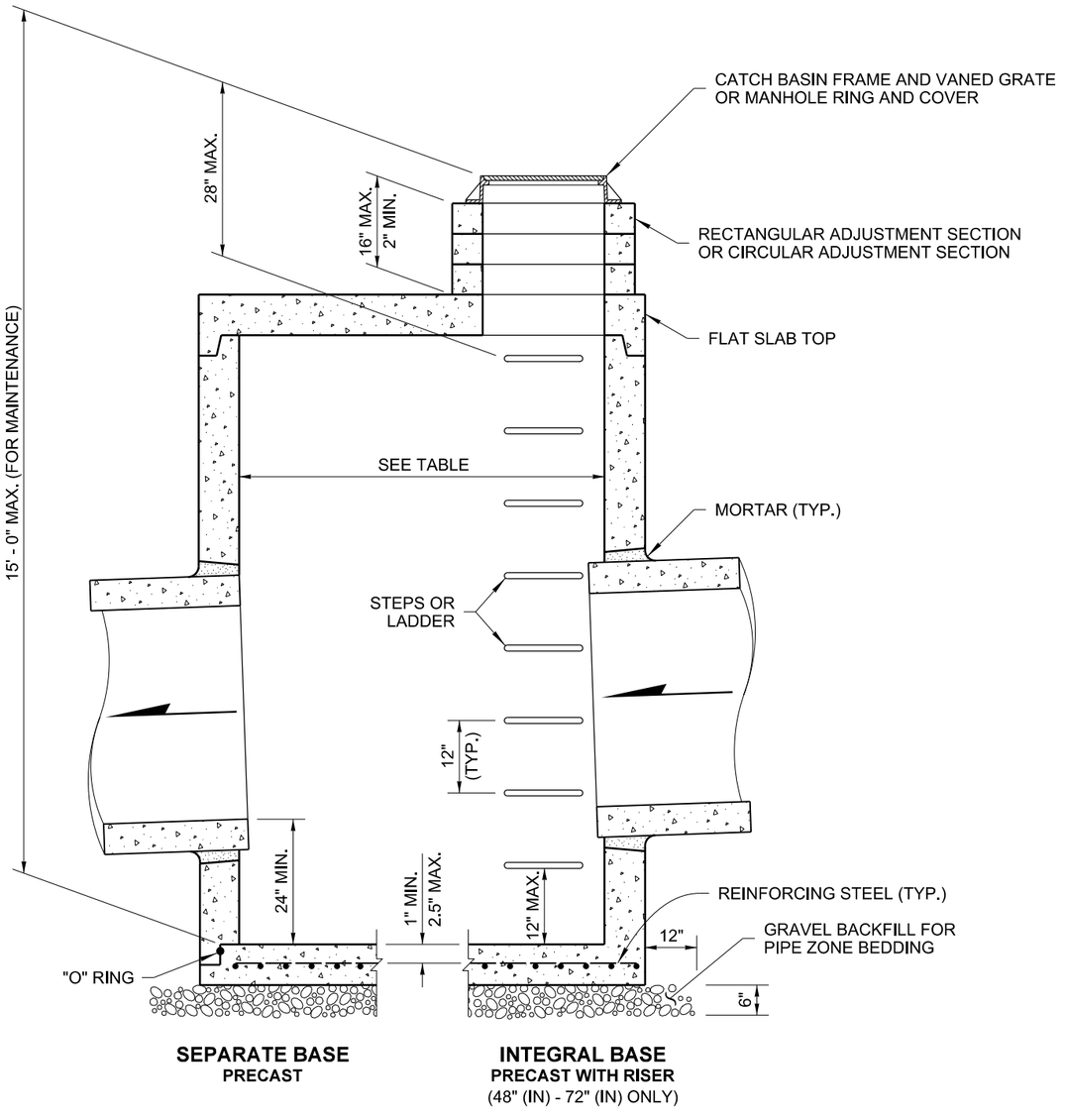
SHEET 1 OF 1 SHEET

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SEPARATE BASE
PRECAST

INTEGRAL BASE
PRECAST WITH RISER
(48" (IN) - 72" (IN) ONLY)

NOTES

1. No steps are required when height is 4' or less.
2. The bottom of the precast catch basin may be sloped to facilitate cleaning.
3. The rectangular frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.
4. Knockouts shall have a wall thickness of 2" (in) minimum to 2.5" (in) maximum. Provide a 1.5" (in) minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with **Standard Specification Section 9-04.3.**

CATCH BASIN DIMENSIONS

CATCH BASIN DIAMETER	MIN. WALL THICKNESS	MIN. BASE THICKNESS	MAXIMUM KNOCKOUT SIZE	MINIMUM DISTANCE BETWEEN KNOCKOUTS
48"	4"	6"	36"	8"
54"	4.5"	8"	42"	8"
60"	5"	8"	48"	8"
72"	6"	8"	60"	12"
84"	8"	12"	72"	12"
96"	8"	12"	84"	12"
120"	10"	12"	96"	12"
144"	12"	12"	108"	12"

PIPE ALLOWANCES

CATCH BASIN DIAMETER	PIPE MATERIAL WITH MAXIMUM INSIDE DIAMETER				
	CONCRETE	ALL METAL	CPSSP ① PP ④	SOLID WALL PVC ②	PROFILE WALL PVC ③
48"	24"	30"	24"	30"	30"
54"	30"	36"	30"	36"	36"
60"	36"	42"	36"	42"	42"
72"	42"	54"	42"	48"	48"
84"	54"	60"	54"	48"	48"
96"	60"	72"	60"	48"	48"
120"	66"	84"	60"	48"	48"
144"	78"	96"	60"	48"	48"

① Corrugated Polyethylene Storm Sewer Pipe
(See **Standard Specification Section 9-05.20)**

② **(See Standard Specification Section 9-05.12(1))**

③ **(See Standard Specification Section 9-05.12(2))**

④ Polypropylene Pipe **(See Standard Specification Section 9-05.24)**

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CATCH BASIN TYPE 2

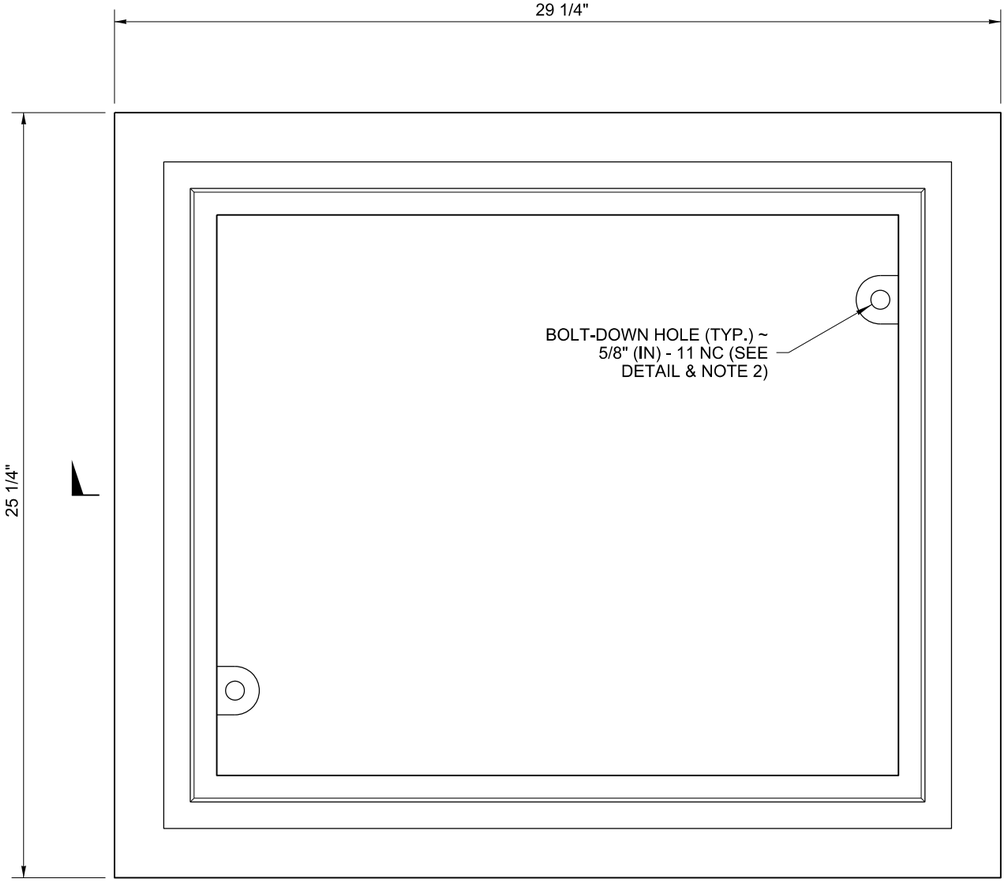
STANDARD PLAN B-10.20-02

SHEET 1 OF 1 SHEET

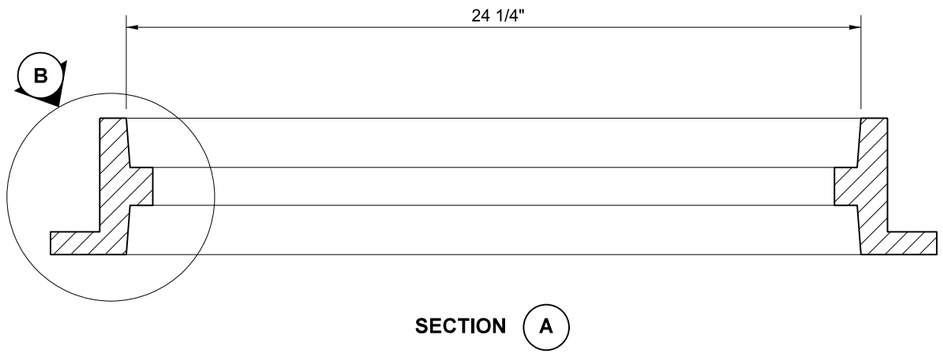
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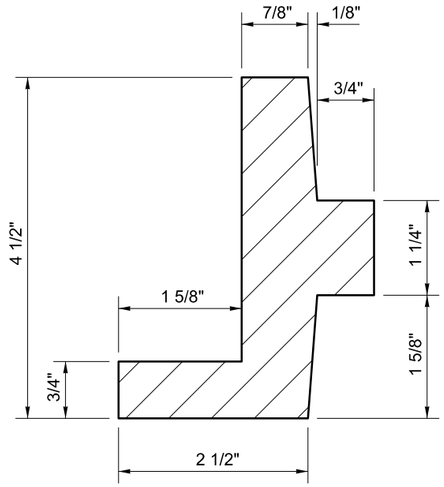
Washington State Department of Transportation



TOP



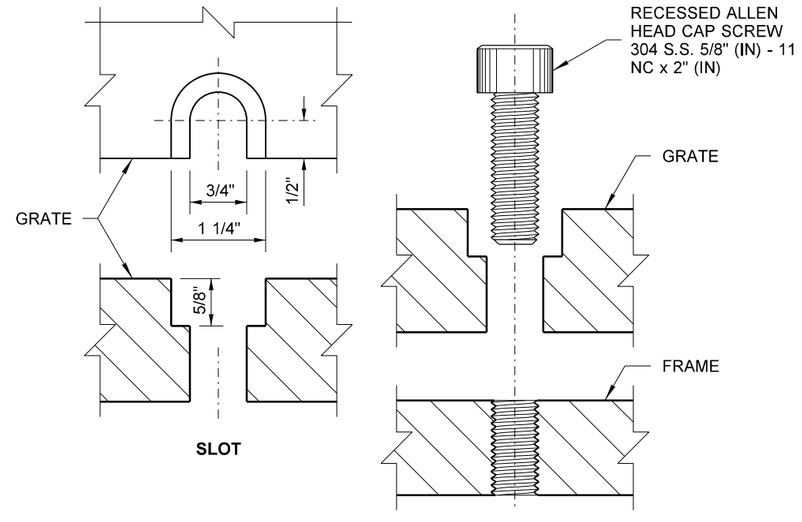
SECTION A



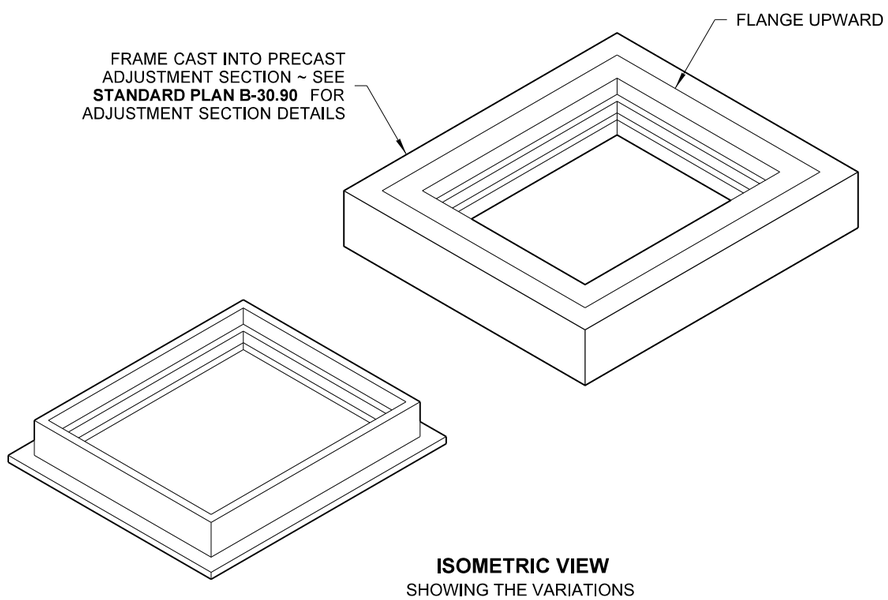
DETAIL B

NOTES

1. This frame is designed to accommodate 20" (in) × 24" (in) grates or covers as shown on **Standard Plans B-30.20, B-30.30, B-30.40,** and **B-30.50.**
2. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
3. Refer to **Standard Specification Section 9-05.15** and **9-05.15(2)** for additional requirements.



BOLT-DOWN DETAILS
SEE NOTE 2



ISOMETRIC VIEW
SHOWING THE VARIATIONS

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RECTANGULAR FRAME (REVERSIBLE)

STANDARD PLAN B-30.10-03

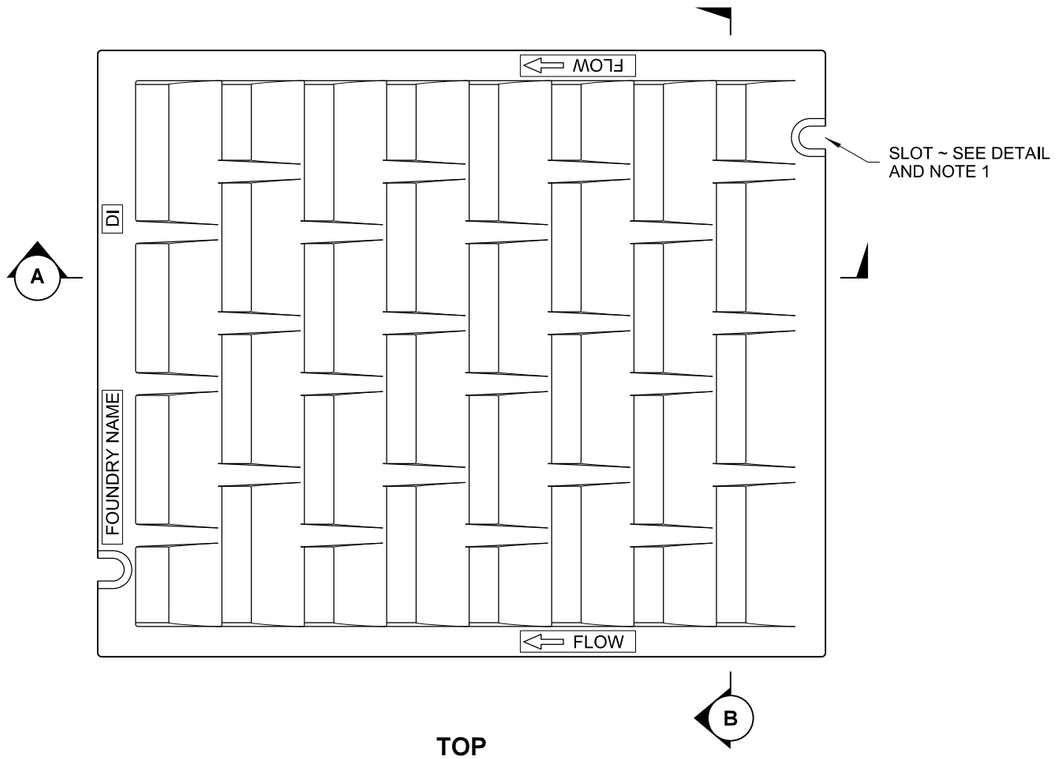
SHEET 1 OF 1 SHEET

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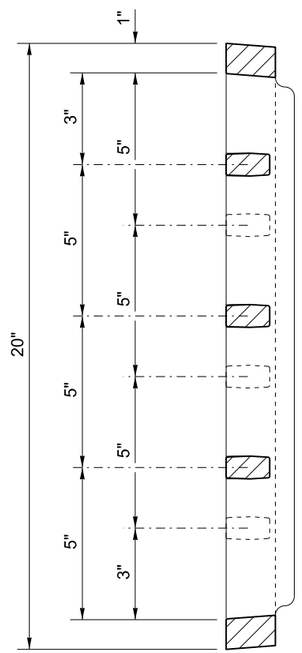
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TOP

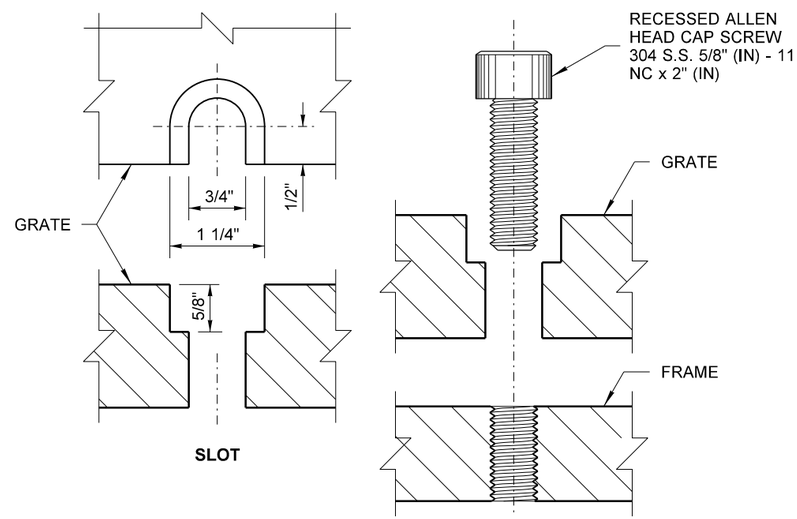


SECTION B

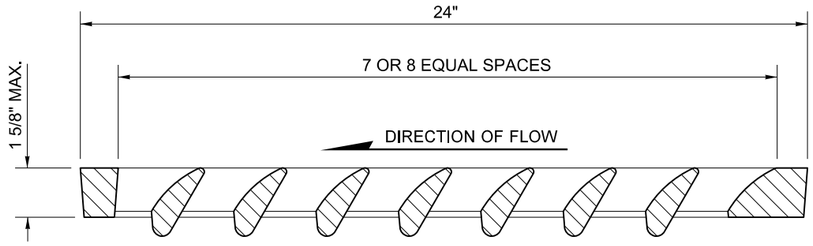
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NOTES

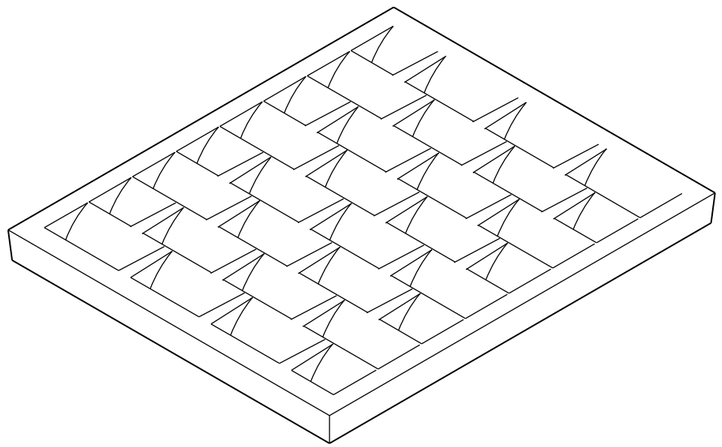
1. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
2. Refer to **Standard Specification Section 9-05.15** and **9-05.15(2)** for additional requirements.
3. For frame details, see **Standard Plan B-30.10**.



BOLT-DOWN DETAILS
SEE NOTE 1



SECTION A



ISOMETRIC



RECTANGULAR VANED GRATE

STANDARD PLAN B-30.30-03

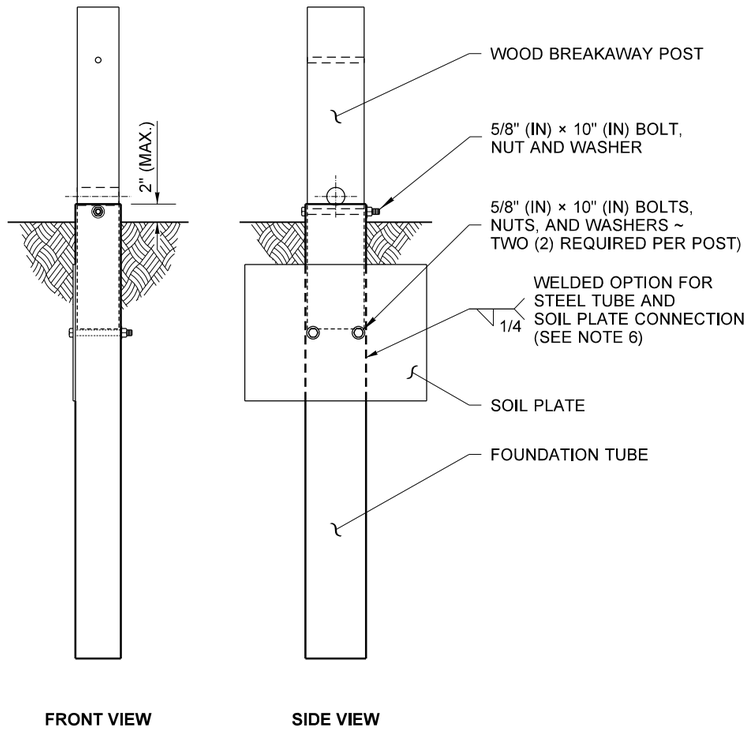
SHEET 1 OF 1 SHEET

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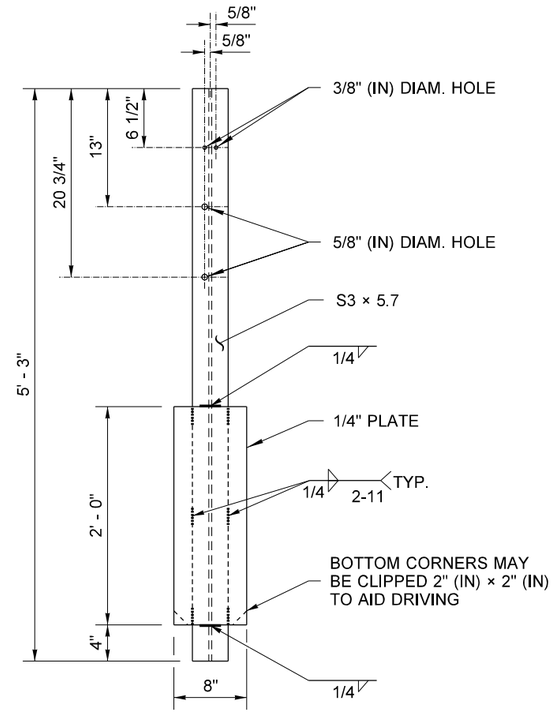
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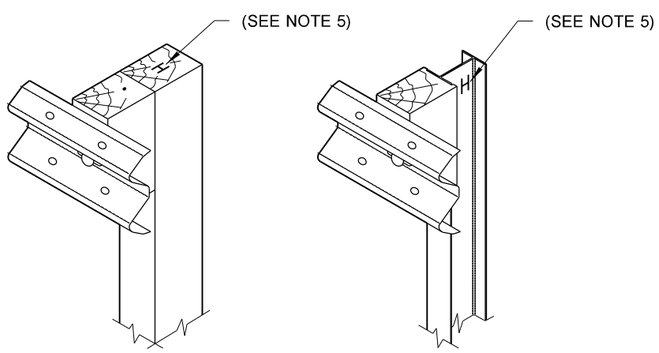


FRONT VIEW SIDE VIEW

ANCHOR POST ASSEMBLY

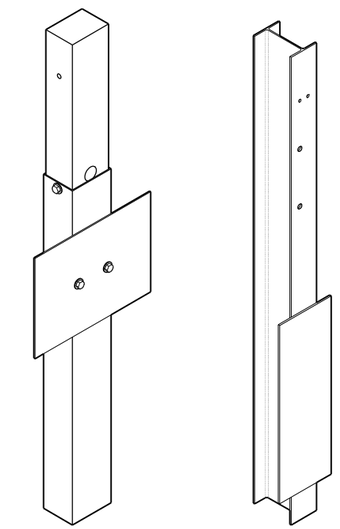


G-2 POST



TIMBER POST **STEEL POST**

PARTIAL ASSEMBLY DETAIL



ANCHOR POST **G-2 POST**

ISOMETRIC

NOTES

1. Wood posts for all guardrail placement plans shall be 6 × 8 except where noted otherwise.
2. Lower hole is for Rub Rail of Type 2 and Type 3 Beam Guardrail.
3. W6×8.5 or W6×9 steel posts and timber blocks are alternates for 6×8 timber posts and blocks. W6×15 steel posts and timber blocks are alternates for 10×10 timber posts and blocks.
4. Attach blockouts to steel posts using bolt holes on approaching traffic side of post web.
5. When "Beam Guardrail Type - _ _ Ft. Long Post" is specified in the Contract, the post length shall be stamped with numbers, 1 1/2" (in) min. high and 3/4" (in) wide at the location where the letter "H" is shown in the ASSEMBLY DETAIL. For wood post applications, the letter shall be stamped to a minimum depth of 1/4" (in). For steel post applications, the letter shall be legible after the post is galvanized. After post installation, it shall be the Contractor's responsibility to ensure the stamped numbers remain visible.
6. Soil plate may be welded to foundation tube. If so, holes in soil plate and foundation tube may be omitted.

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BEAM GUARDRAIL POSTS AND BLOCKS

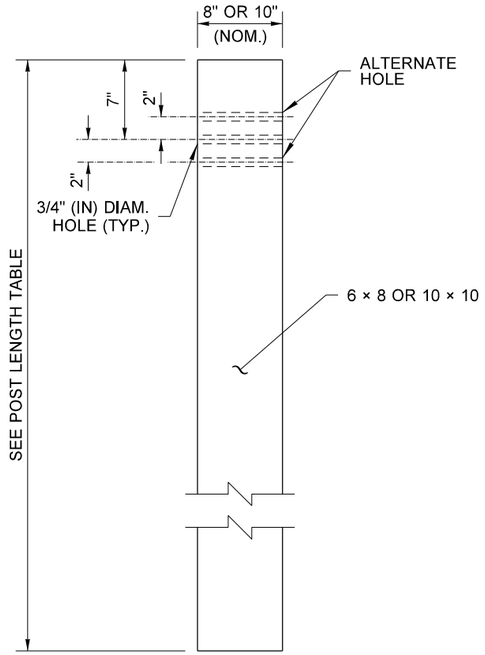
STANDARD PLAN C-1b

SHEET 1 OF 2 SHEETS

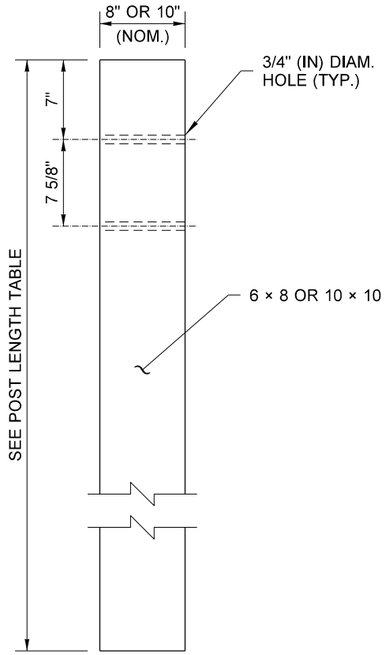
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STATE DESIGN ENGINEER

Washington State Department of Transportation

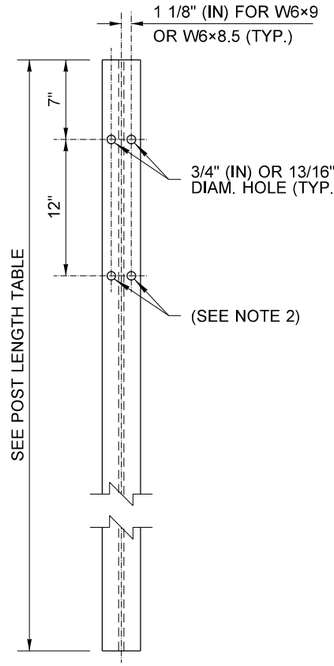


W-BEAM

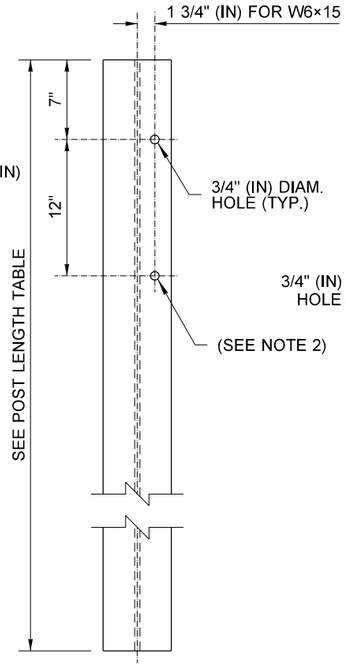


THRIE BEAM

WOOD POST



W-BEAM

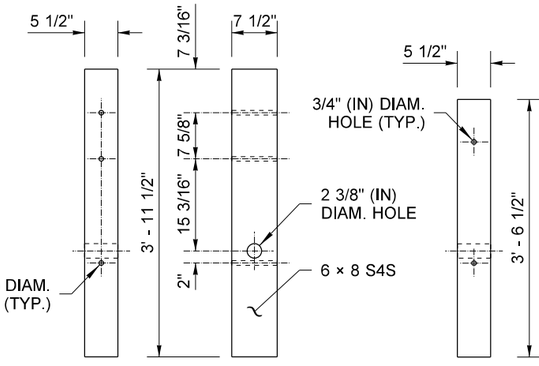


THRIE BEAM

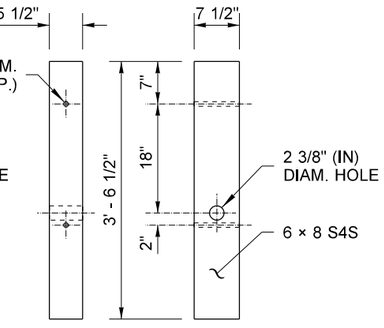
STEEL POST
(SEE NOTES 3 AND 4)

POST LENGTH TABLE	
GUARDRAIL TYPE	LENGTH
1 through 4 & 31	6' - 0" *
10 or 11	6' - 6"

* SEE CONTRACT FOR "BEAM GUARDRAIL TYPE - __ FT. LONG POST" LENGTHS. (SEE NOTE 5)

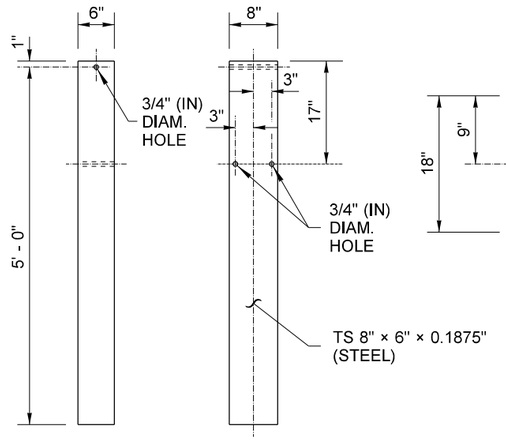


THRIE BEAM

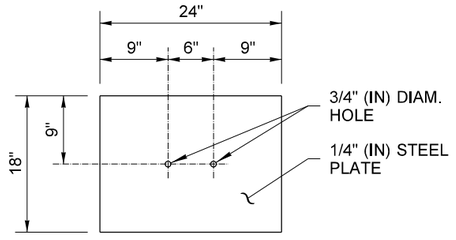


W-BEAM

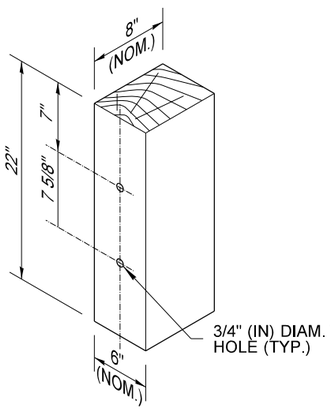
WOOD BREAKAWAY POST



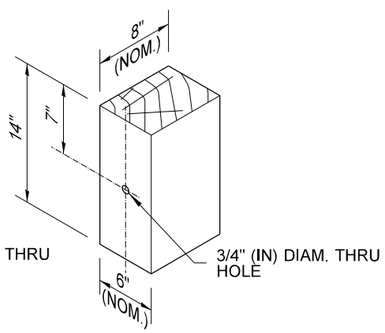
FOUNDATION TUBE



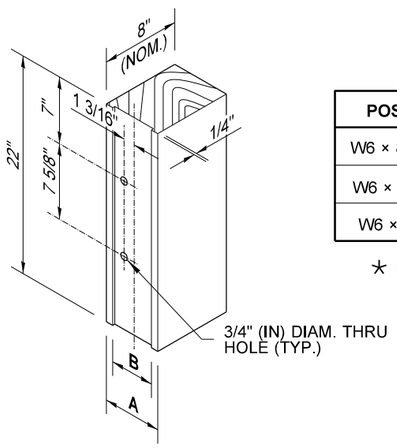
SOIL PLATE



THRIE BEAM WOOD BLOCK
FOR WOOD POST



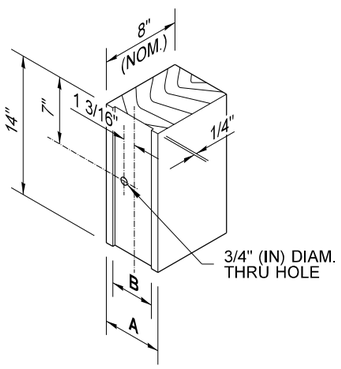
W-BEAM WOOD BLOCK
FOR WOOD POST



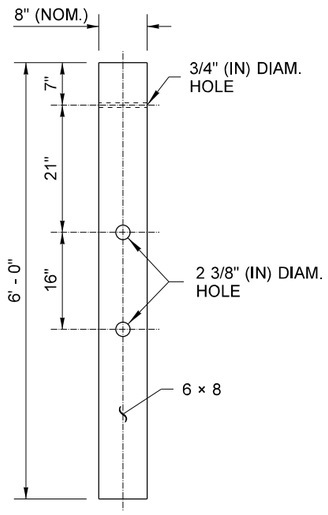
THRIE BEAM WOOD BLOCK
FOR STEEL POST

POST	A	B
W6 × 8.5	8" **	6 1/4"
W6 × 15	8" **	6 1/4"
W6 × 9	6" **	4 1/4"

** NOMINAL (NOM.)



W-BEAM WOOD BLOCK
FOR STEEL POST



CONTROLLED RELEASING
TERMINAL (CRT) POST

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BEAM GUARDRAIL POSTS AND BLOCKS

STANDARD PLAN C-1b

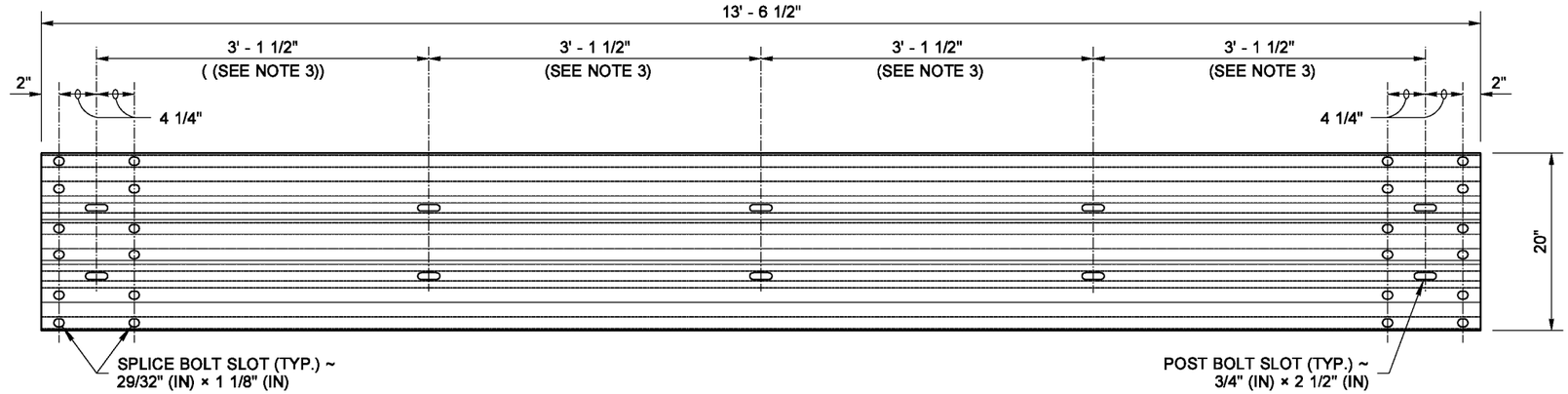
SHEET 2 OF 2 SHEETS

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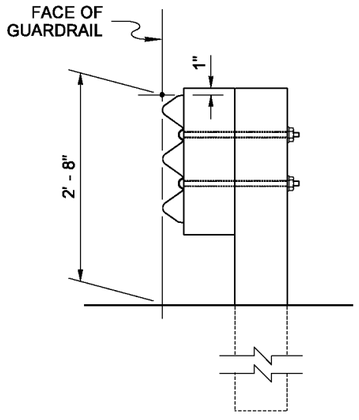
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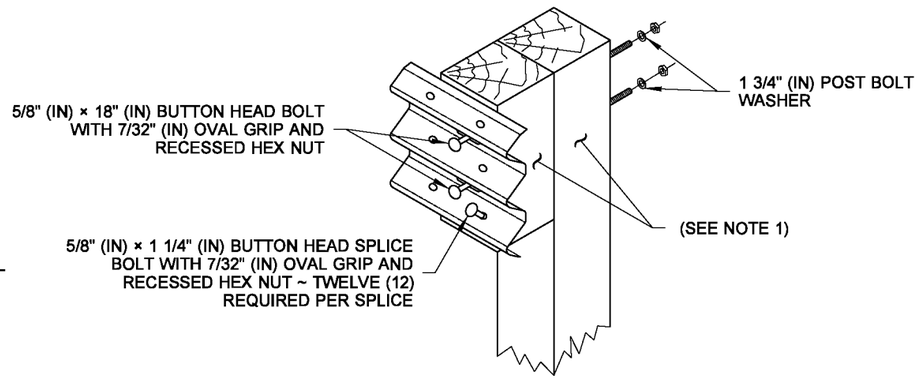
NOTES

1. Type 10 post shall be 6 × 8 timber, OR either W6 × 9, or W6 × 8.5 steel.
   Type 11 post shall be 10 × 10 timber or W6 × 15.
   For additional details see **Standard Plan C-1b.**
2. Type 10 guardrail post spacing shall be 6' - 3" on center.
   Type 11 shall be a maximum of 3' - 1 1/2" on center.
3. Spacing may vary depending on application. See **Standard Specification Section 9-16.3(1)** for rail element requirements.

TYPICAL RAIL ELEMENT

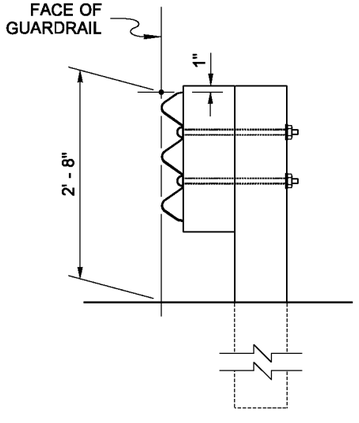


RAIL ASSEMBLY

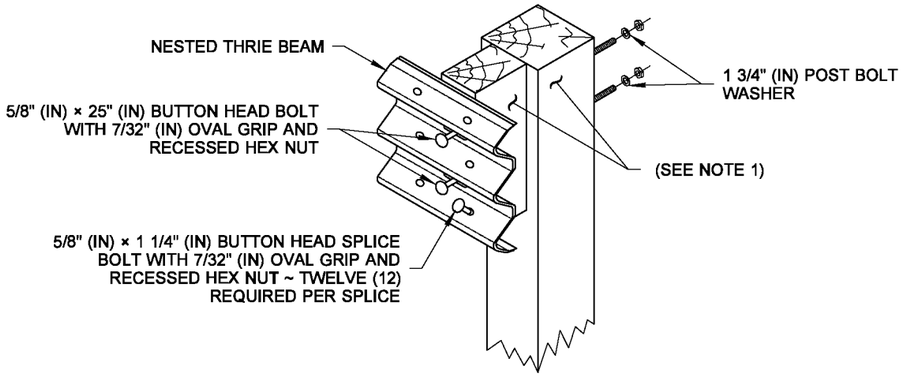


WOOD POST ASSEMBLY

TYPE 10

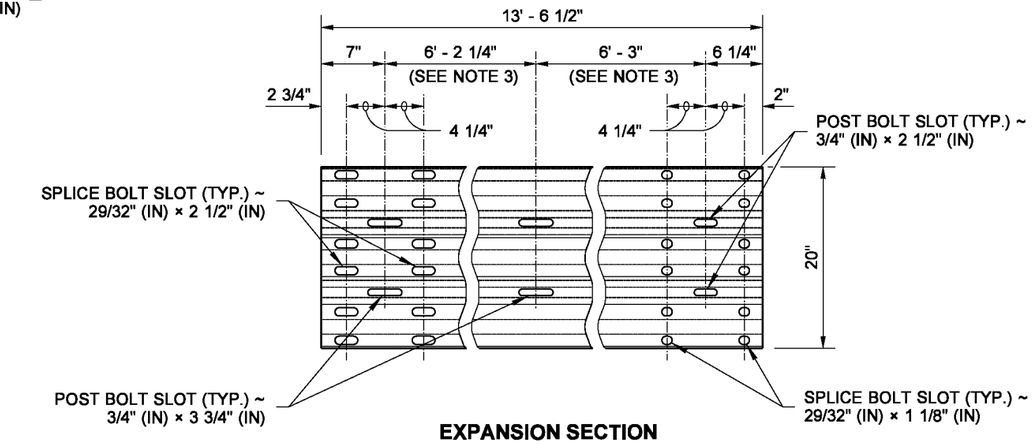


RAIL ASSEMBLY

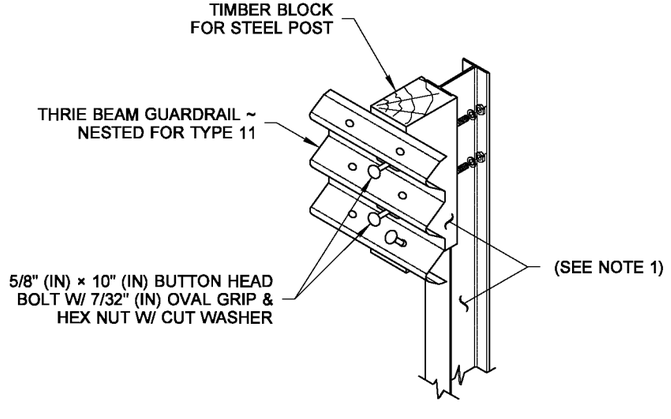


WOOD POST ASSEMBLY

TYPE 11



EXPANSION SECTION



STEEL POST ASSEMBLY

TYPES 10 AND 11

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BEAM GUARDRAIL (THRIE BEAM)

STANDARD PLAN C-1a

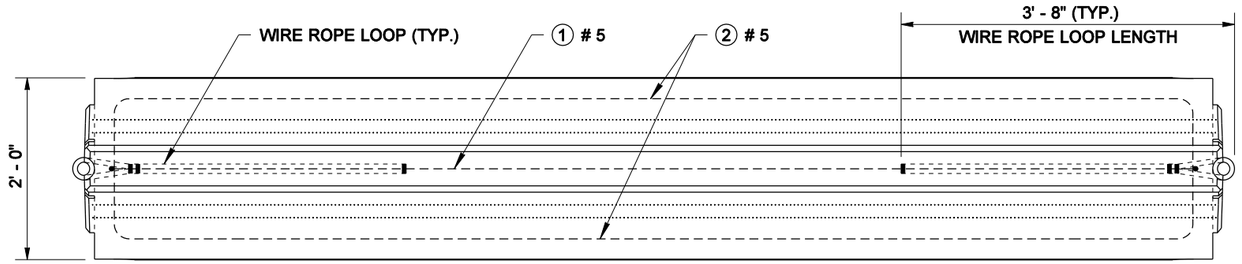
SHEET 1 OF 1 SHEET

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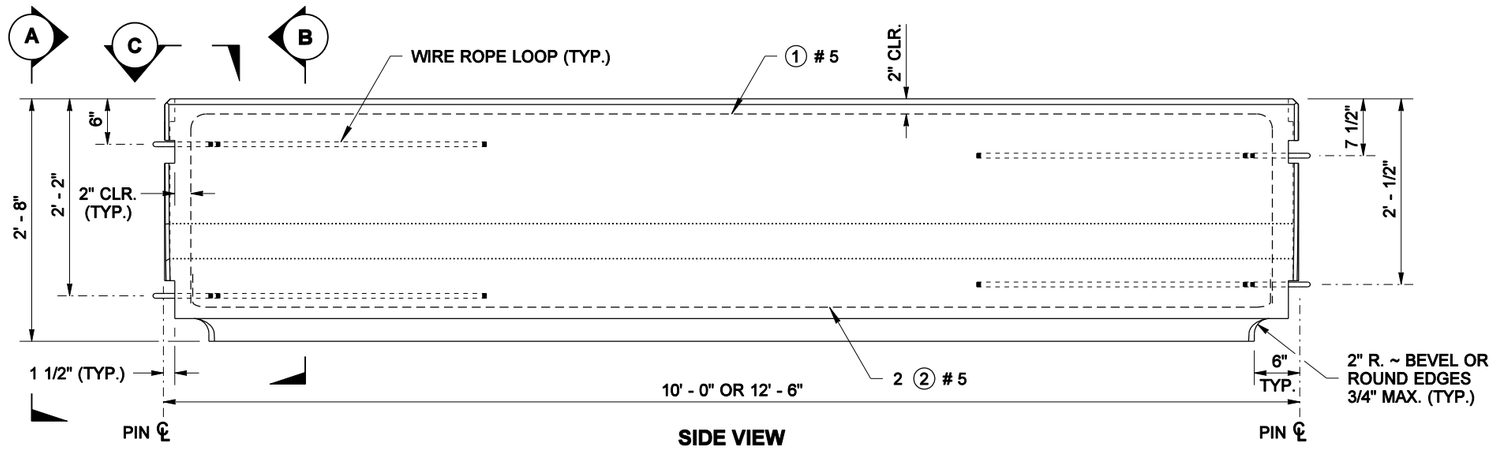
STATE DESIGN ENGINEER

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DRAWN BY: MARK SUJKA



TOP VIEW

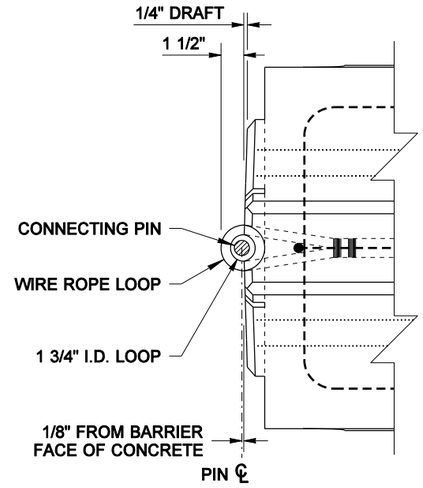


SIDE VIEW

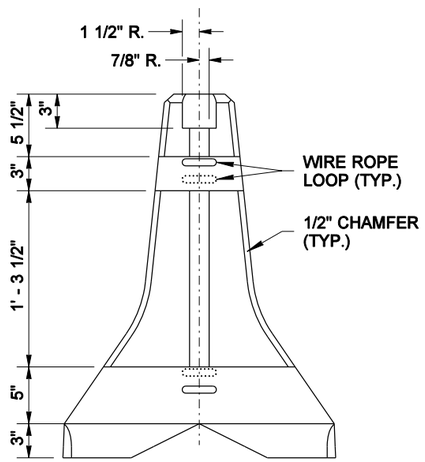
BARRIER SECTION

NOTES

1. Wire rope loops shall be 3' - 8" long, except for the top loop of the Barrier Terminal, which shall be 2' - 0" long.
2. Except for the locations of the wire rope loops, the dimensions shown in END VIEW "A" are typical for both ends of a Barrier Section or opposing ends of Barrier Terminals.
3. Connecting and Drift Pin head designs vary among different manufacturers. Pin designs that are shaped differently than those shown in the detail are acceptable, if the bearing surface is within the minimum and maximum widths specified.
4. The vertical spacing of the Wire Rope Loops in a Barrier Terminal is determined by the end of the Barrier Segment to which it is being connected. See BARRIER CONNECTION DETAIL (Sheet 2).

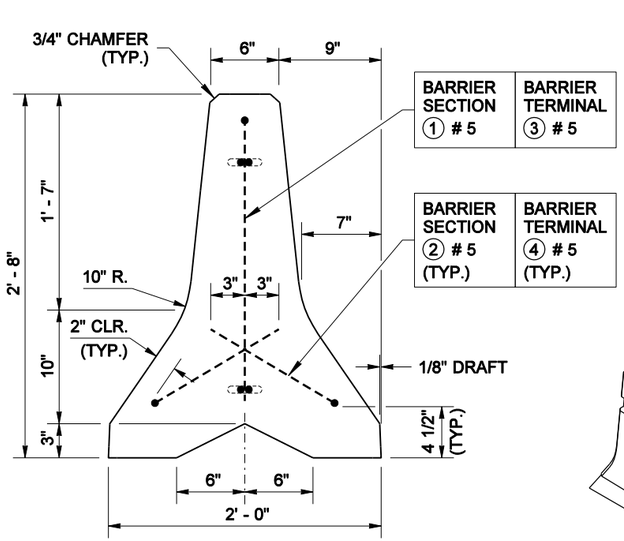


DETAIL C

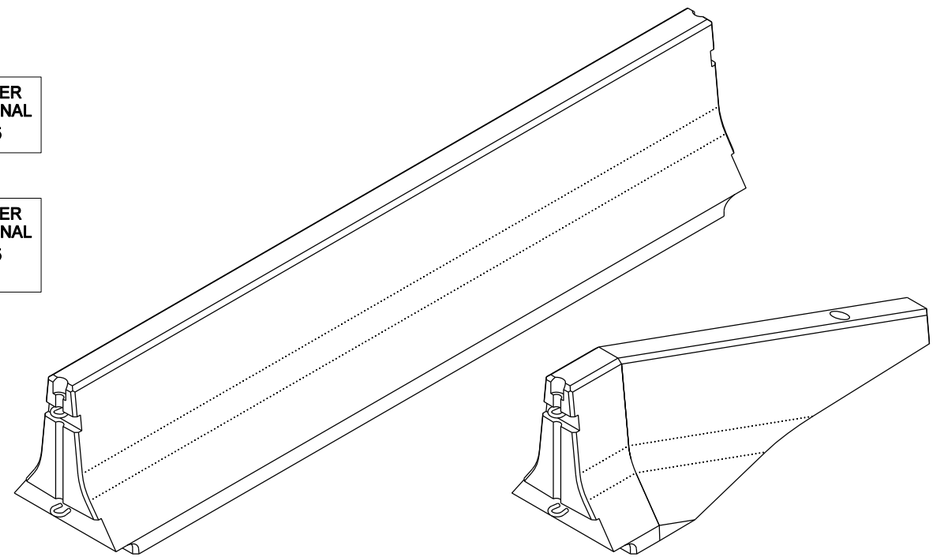


SEE NOTE 2

END VIEW (A)



SECTION (B)



BARRIER SECTION **BARRIER TERMINAL**

ISOMETRIC VIEWS



NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

CONCRETE BARRIER TYPE 2

STANDARD PLAN C-8

SHEET 1 OF 2 SHEETS

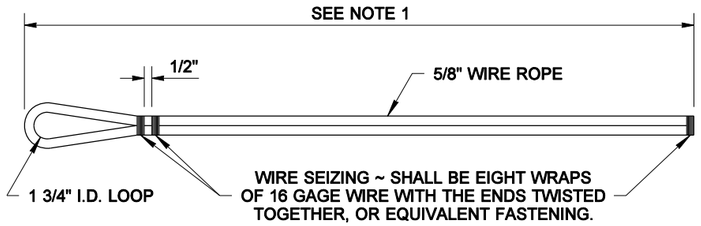
APPROVED FOR PUBLICATION

Pasco Bakotich III — STATE DESIGN ENGINEER

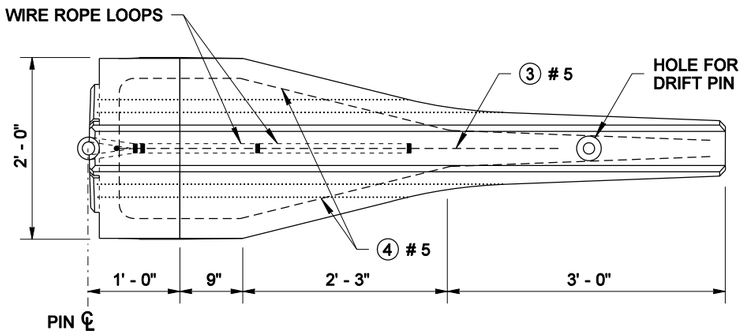
02-10-09 — DATE

Washington State Department of Transportation

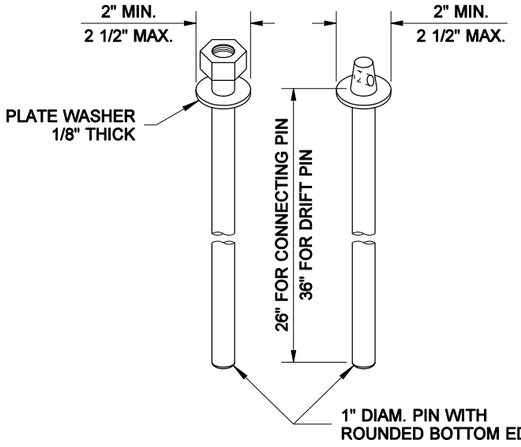
DRAWN BY: MARK SUJKA



WIRE ROPE LOOP DETAIL

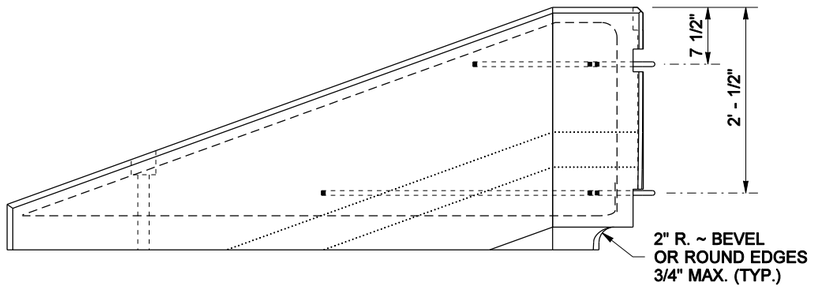


TOP VIEW

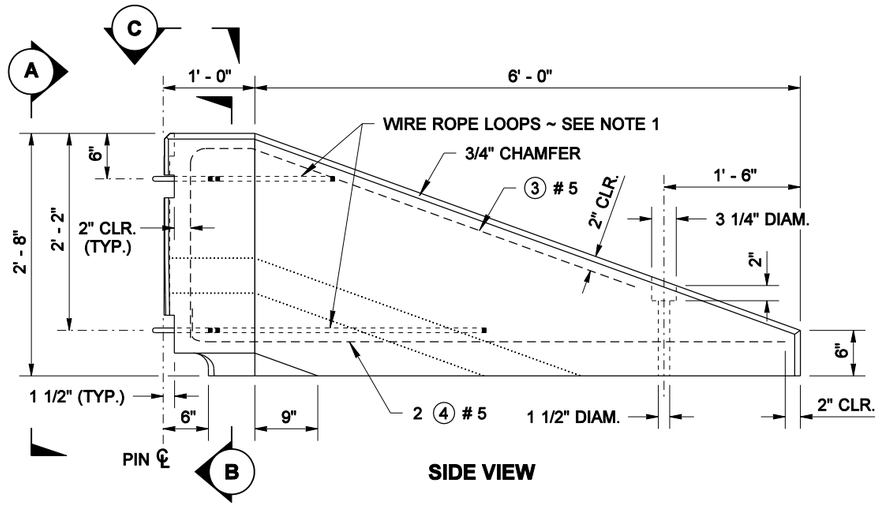


SEE NOTE 3

CONNECTING PINS AND DRIFT PINS



SIDE VIEW

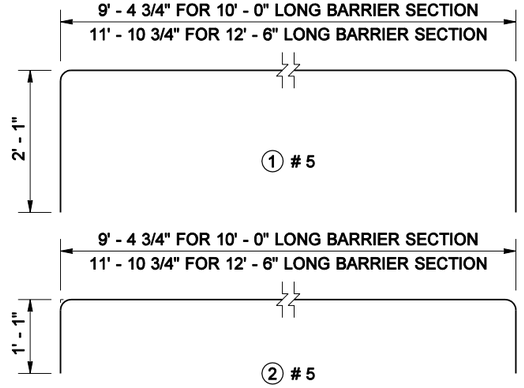


SIDE VIEW

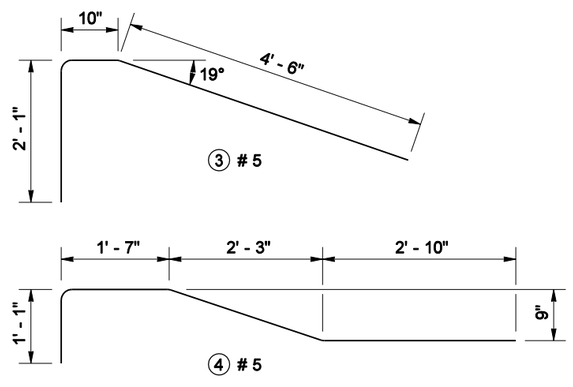
SEE NOTE 4

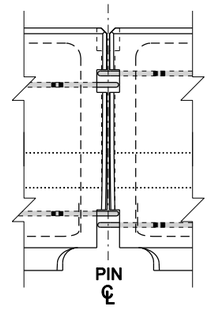
BARRIER TERMINAL

BARRIER SECTION REINFORCING STEEL BENDING DIAGRAM



BARRIER TERMINAL REINFORCING STEEL BENDING DIAGRAM





BARRIER CONNECTION DETAIL



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CONCRETE BARRIER TYPE 2

STANDARD PLAN C-8

SHEET 2 OF 2 SHEETS

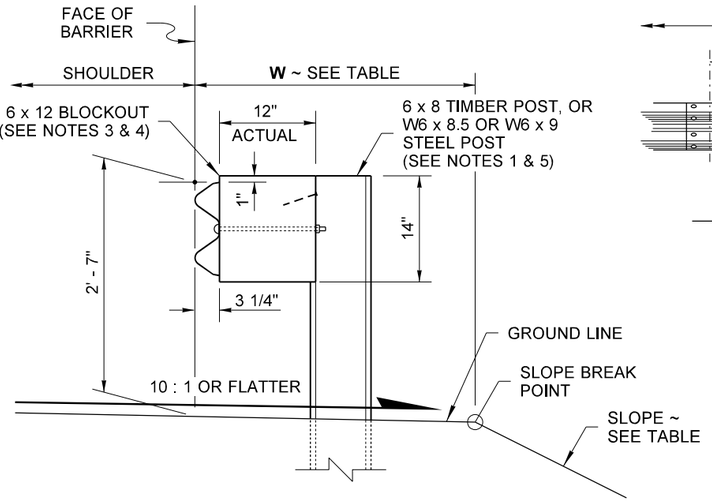
APPROVED FOR PUBLICATION

Pasco Bakotich III — STATE DESIGN ENGINEER

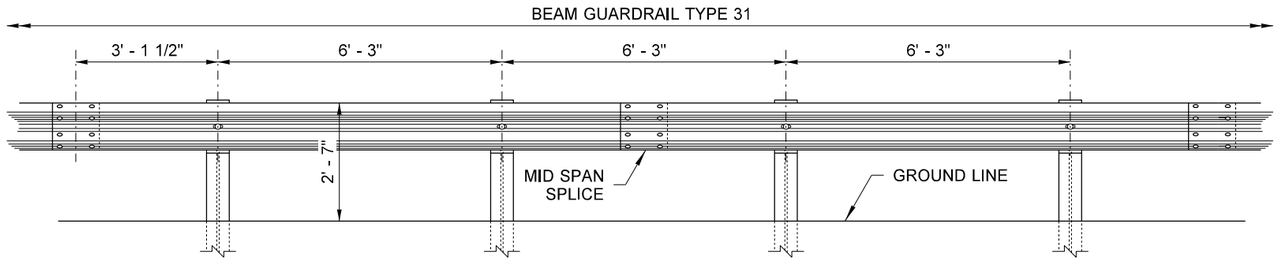
02-10-09 — DATE

Washington State Department of Transportation

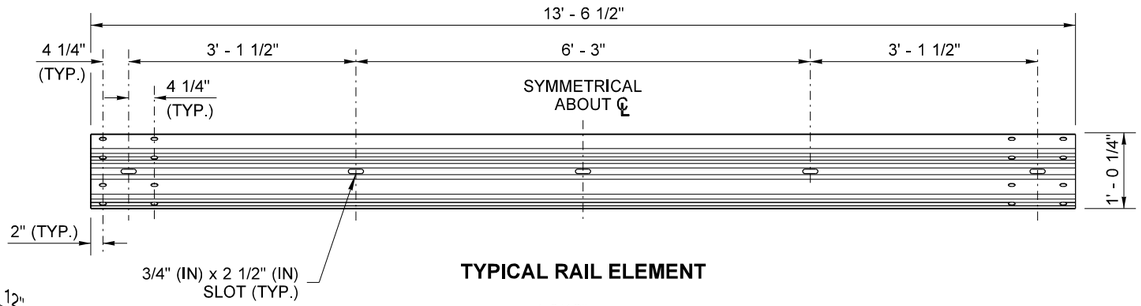
DRAWN BY: FERN LIDDELL



TYPICAL SECTION ~ WITHOUT CURB
(6' - 0" POSTS)



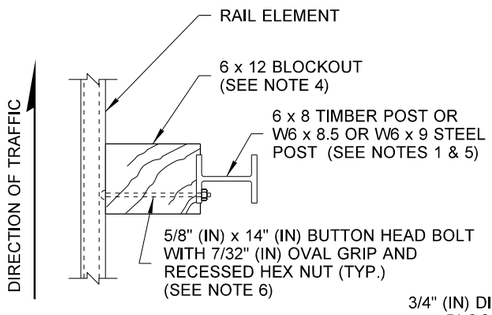
TYPICAL ELEVATION



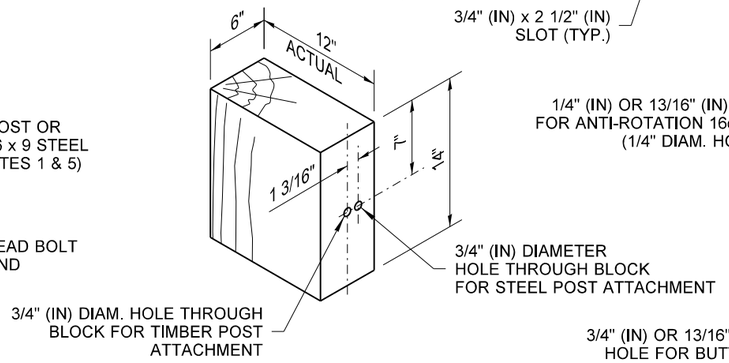
TYPICAL RAIL ELEMENT

NOTES

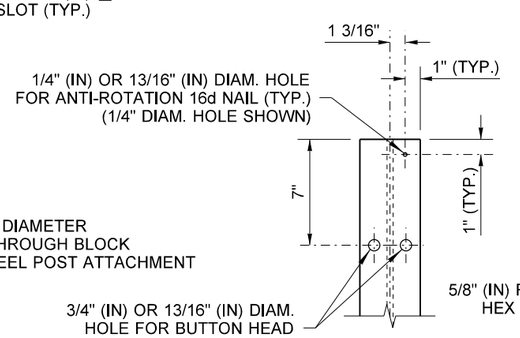
1. Refer to **Standard Plan C-1b** and **C-20.11** for additional details not shown on this plan.
2. Extend shoulder pavement to provide a base for the extruded curb. See Contract Plans for exceptions to distances shown.
3. Use a single block or combination of blocks (no more than two (2) to achieve the actual 12" (in) offset. See **Standard Specification, Section 9-16.3(2)**. Wood blocks shall be secured to the posts with anti-rotation nails. If combination blocks are used, the adjacent blocks shall be toenailed with two 16d galvanized nails to prevent block rotation.
4. Wood blocks are shown. Blocks of an approved alternative material may be used. See **Standard Specification, Section 9-16.3(2).**
5. All posts for any standard barrier run shall be of the same type: timber or steel.
6. Attach blockouts to steel posts using bolt holes on approaching traffic side of post web.



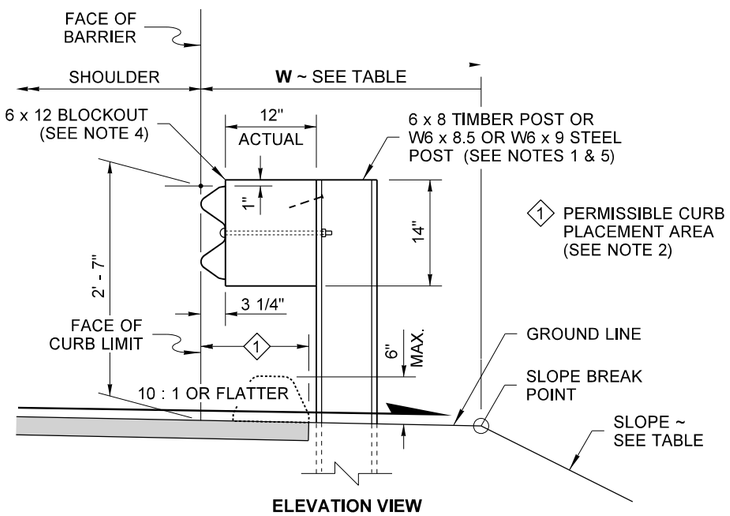
PLAN VIEW



WOOD BLOCK



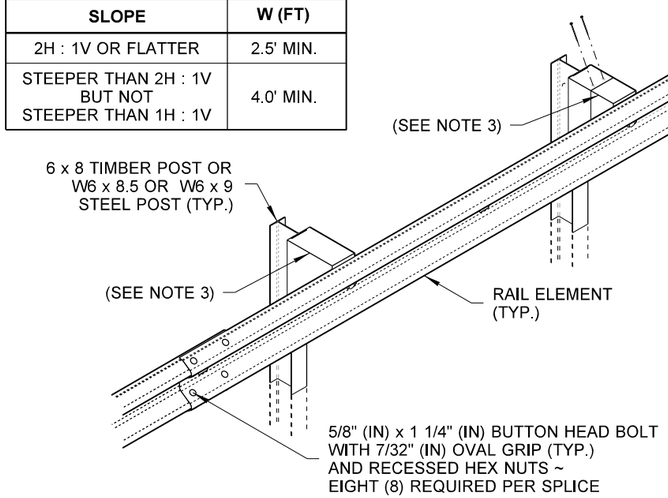
STEEL POST

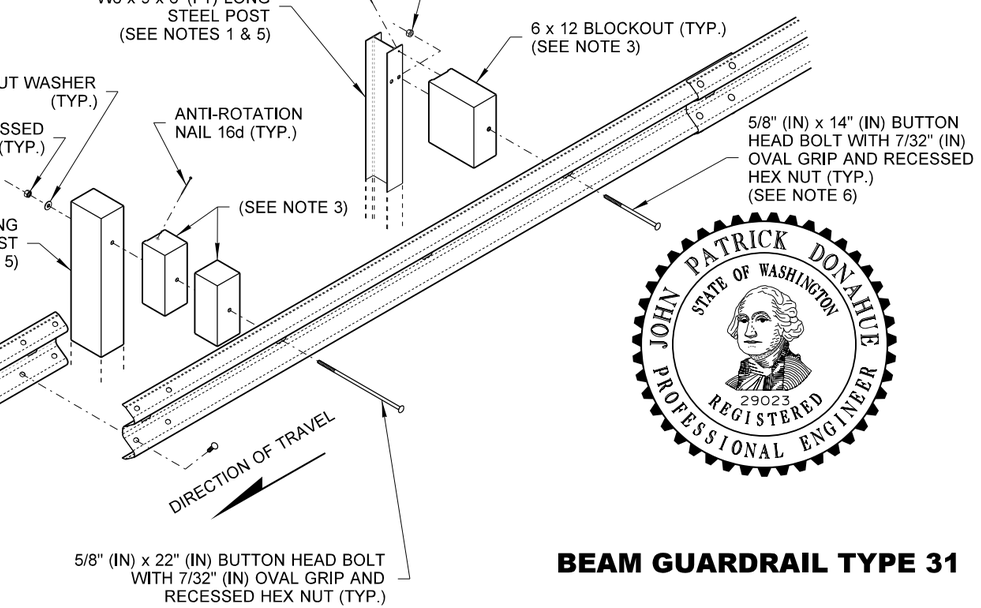


ELEVATION VIEW

TYPICAL SECTION ~ WITH CURB
(6' - 0" LONG POSTS)

SLOPE \ EMBANKMENT TABLE FOR STD. 6' POSTS	
SLOPE	**W (FT)**
2H : 1V OR FLATTER	2.5' MIN.
STEEPER THAN 2H : 1V BUT NOT STEEPER THAN 1H : 1V	4.0' MIN.





ISOMETRIC VIEW

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

BEAM GUARDRAIL TYPE 31

STANDARD PLAN C-20.10-05

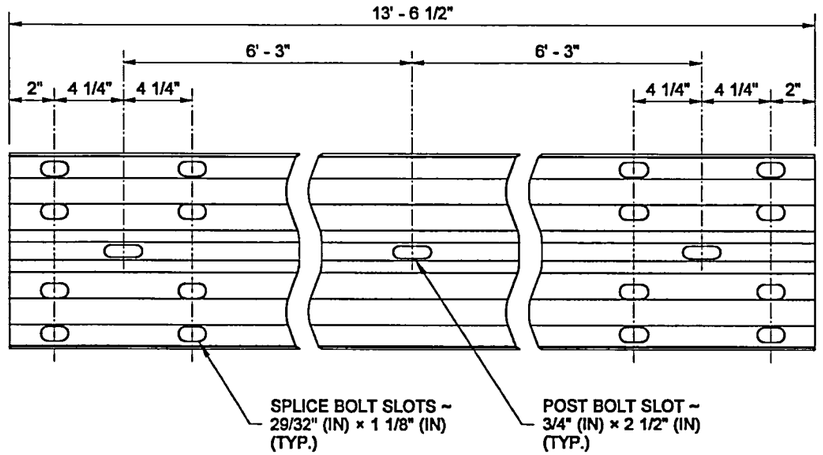
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

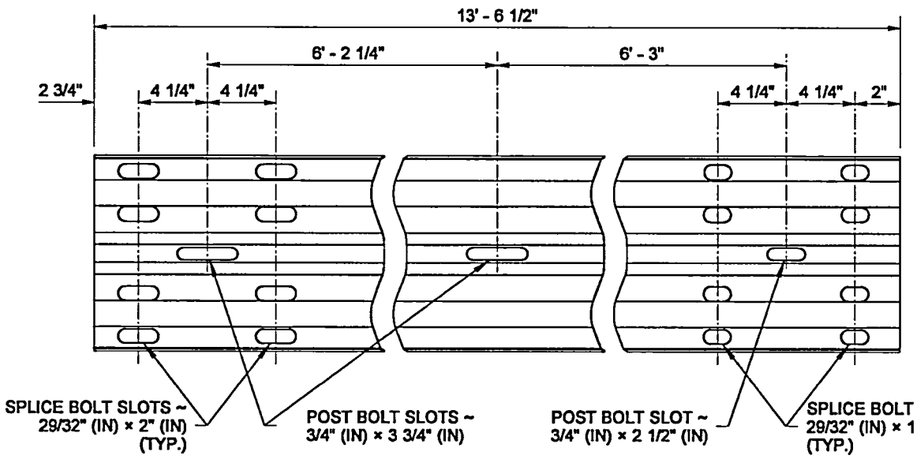
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



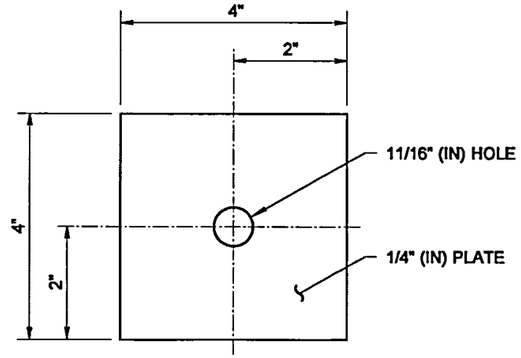
TYPICAL RAIL ELEMENT



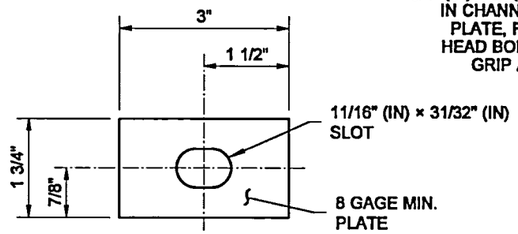
EXPANSION SECTION

NOTES

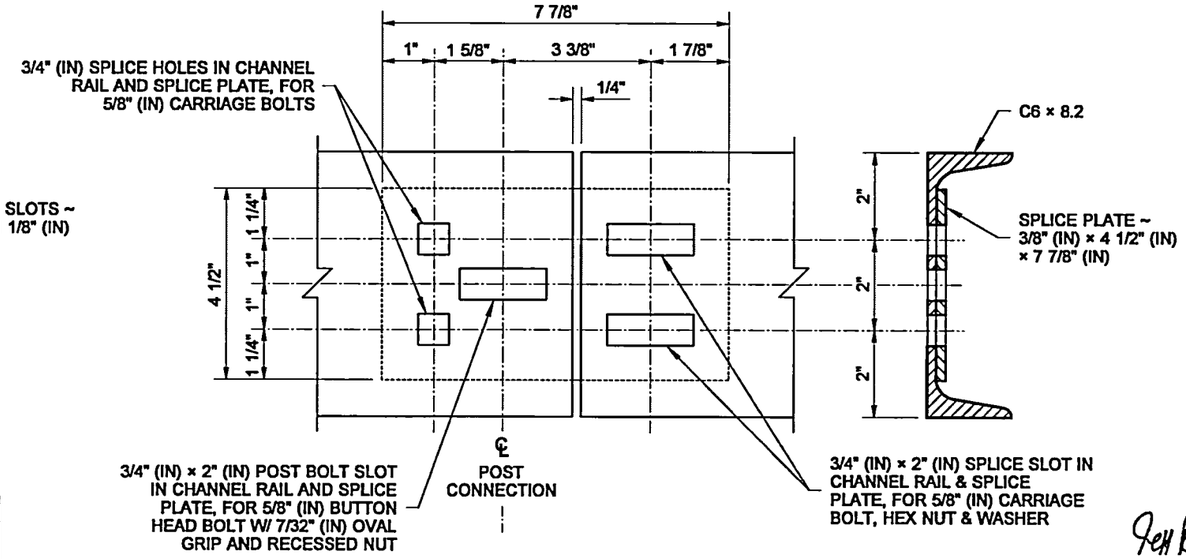
1. When required by the Contract, a Snow Load Post Washer shall be used on the backside of the post (in lieu of the 1 3/4" (in) Post Bolt Washer) and a Snow Load Rail Washer shall be placed on the face side of Beam Guardrail Types 1 and 2. Snow Load Rail Washers shall not be installed on terminals.
2. Rail Washers, also called "Snow Load Rail Washers", are not required on new installation, except as called for in Note 1. Unnecessary Rail washers need not be removed from existing installations, except those on posts 2 through 8 of a BCT installation shall be removed.
3. Timber blocks shall be toe-nailed to the post with a 16d galvanized nail to prevent block rotation.
4. For post and block details, see **Standard Plan C-1b**.
5. When "Beam Guardrail Type - ___ Ft. Long Post" is specified in the Contract, the post length shall be stamped with numbers, 1 1/2" (in) min. high and 3/4" (in) wide at the location where the letter "H" is shown in the ASSEMBLY DETAIL. For wood post applications, the letter shall be stamped to a minimum depth of 1/4" (in). For steel post applications, the letter shall be legible after the post is galvanized. After post installation, it shall be the Contractor's responsibility to ensure the stamped numbers remain visible.
6. Existing posts shall not be raised. Replace posts as necessary to achieve required guardrail height.
7. Holes shall be located on approaching traffic side of web.



SNOW LOAD POST WASHER
SEE NOTE 1



SNOW LOAD RAIL WASHER
SEE NOTES 1 & 2



CHANNEL RAIL SPLICE

JEFFERY K. PETTERSON
STATE OF WASHINGTON
36937
REGISTERED
PROFESSIONAL ENGINEER

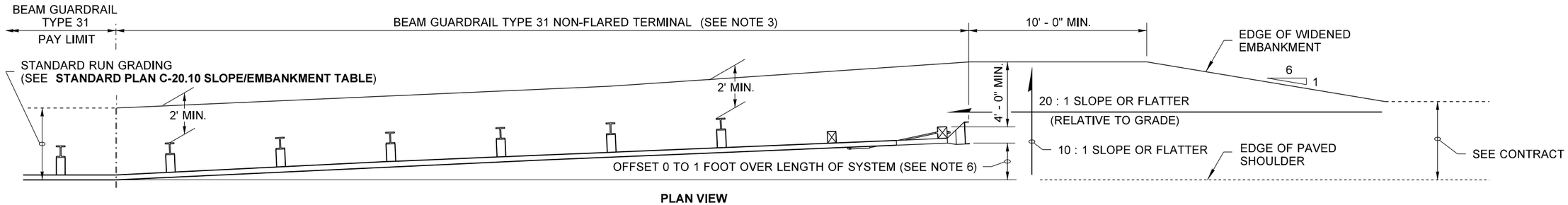
Petterson, Jeff (HQ Design)
Jul 6 2017 3:11 PM
cosign

BEAM GUARDRAIL TYPE 31 COMPONENTS

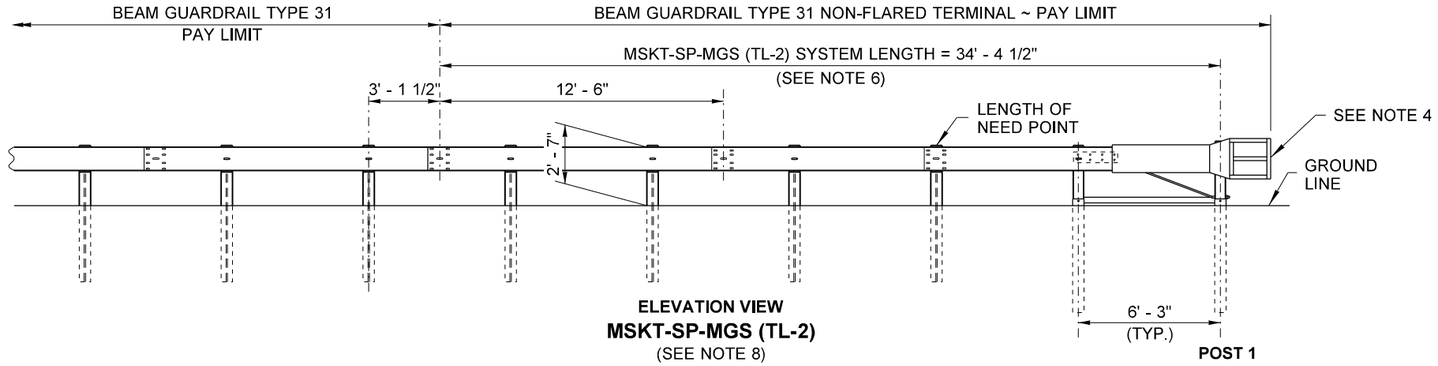
STANDARD PLAN C-20.11-00

SHEET 1 OF 1 SHEET

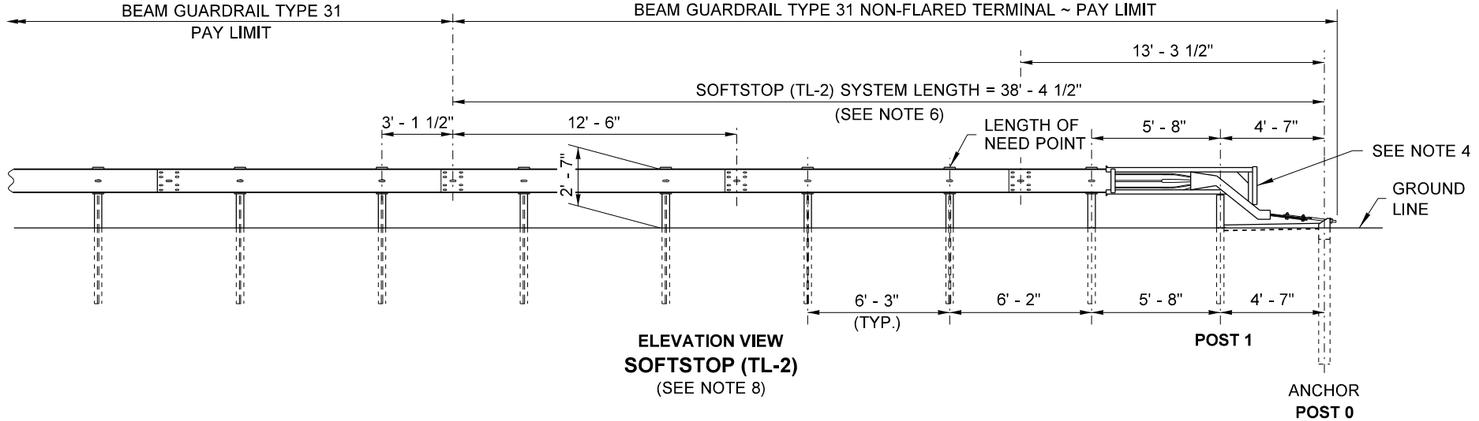
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jul 21 2017 8:31 AM
cosign
STATE DESIGN ENGINEER
Washington State Department of Transportation



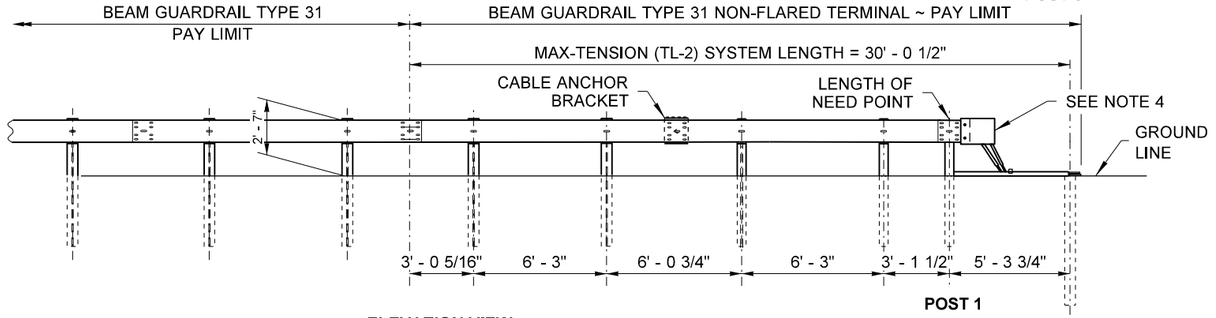
PLAN VIEW
(MSKT-SP-MGS (TL-2) SHOWN)



ELEVATION VIEW
MSKT-SP-MGS (TL-2)
(SEE NOTE 8)



ELEVATION VIEW
SOFTSTOP (TL-2)
(SEE NOTE 8)



ELEVATION VIEW
MAX-TENSION (TL-2)
(SEE NOTE 8)

NOTES

1. The Implementation of the Manual for Assessment of Safety Hardware (MASH) criteria may result in the acceptance of guardrail terminal systems currently not shown on this plan. Non-Flared terminals shall be selected from the WSDOT Qualified Products List (QPL) or approved through the WSDOT Request for Approval of Materials (RAM) process.
2. This terminal is MASH compliant at Test Level Two (TL-2) and may be used in applications with posted speed of 45 mph or less.
3. An MSKT-SP-MGS (TL-2) as manufactured by Road Systems, Inc, SOFTSTOP (TL-2) as manufactured by Trinity Highway Products, LLC, or MAX-TENSION (TL-2) as manufactured by Lindsay Transportation Solutions, shall be installed according to manufacturer's recommendations.
4. A reflectorized object marker shall be installed according to manufacturer's recommendations.
5. Snow load rail washers shall not be installed within the terminal limits.
6. Provide an offset between 0 to 1 foot so that the impact head does not encroach onto the paved shoulder. The offset is provided over the length of the terminal system from the center of the last post splice to either: (1) The face of the impact head at its leading edge (MSKT-SP-MGS), or (2) The center of anchor **Post 0** (Softstop or Max-Tension). Provide the maximum offset where practicable.
7. For terminal details, see WSDOT approved manufacturer's drawings.
8. These terminals are supplied with steel posts only. They can be used with beam guardrail Type 31 runs, composed of steel or wood guardrail posts.



BEAM GUARDRAIL TYPE 31 NON-FLARED TERMINAL (POSTED SPEED 45 MPH AND BELOW)

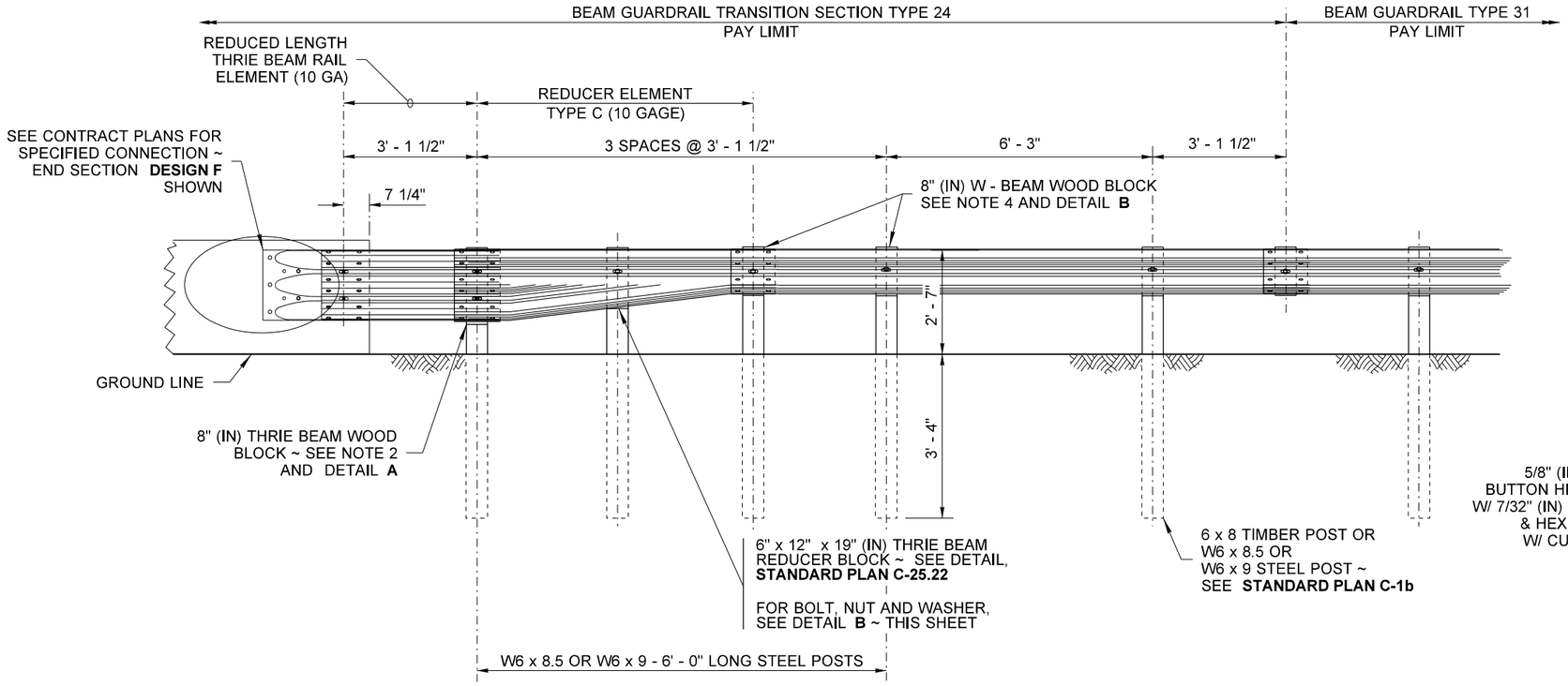
STANDARD PLAN C-22.45-04

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER

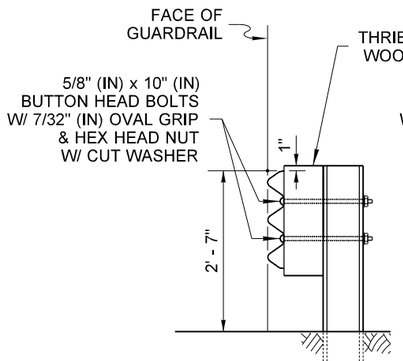
Washington State Department of Transportation



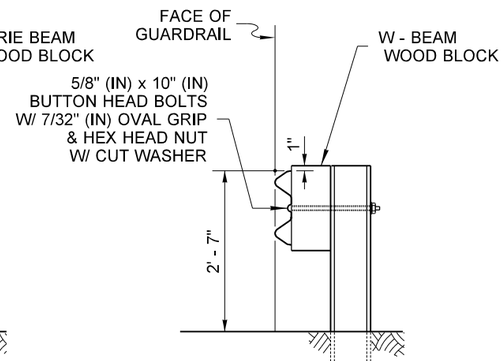
ELEVATION VIEW

NOTES

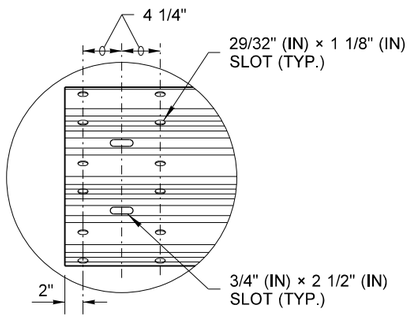
1. This guardrail transition is for connection to a vertical concrete shape, a single slope, or a safety-shape barrier. The toe of the single slope and the safety-shape barrier shall be tapered or the barrier blocked out so that the toe of the barrier does not project beyond the face of the approach guardrail.
2. See **Standard Plan C-1b** for thrie beam wood block detail.
3. See **Standard Plan C-20.10** for typical components (nuts,washers and bolts) at splices.
4. See **Standard Plan C-1b** for W-Beam wood block detail.
5. All rail sections shall be lapped in the direction of traffic.
6. See **Standard Plan C-24.10** for details regarding connection to bridge rail or traffic barrier.



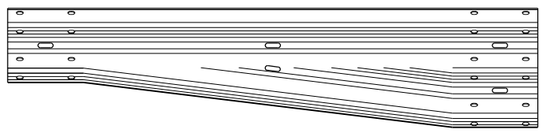
DETAIL A



DETAIL B

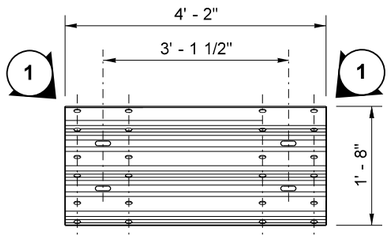


DETAIL (1)

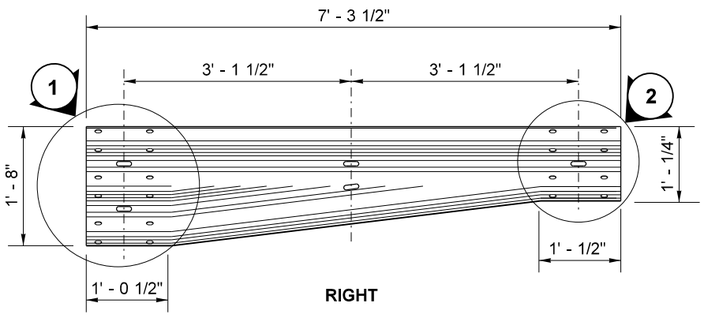


LEFT

(MIRROR OF RIGHT)

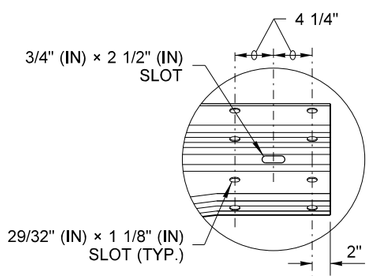


REDUCED LENGTH THRIE-BEAM RAIL ELEMENT 10 GAGE



RIGHT

REDUCER ELEMENT TYPE C



DETAIL (2)



BEAM GUARDRAIL (TYPE 31) TRANSITION SECTION TYPE 24

(POSTED SPEED 45 MPH AND BELOW)

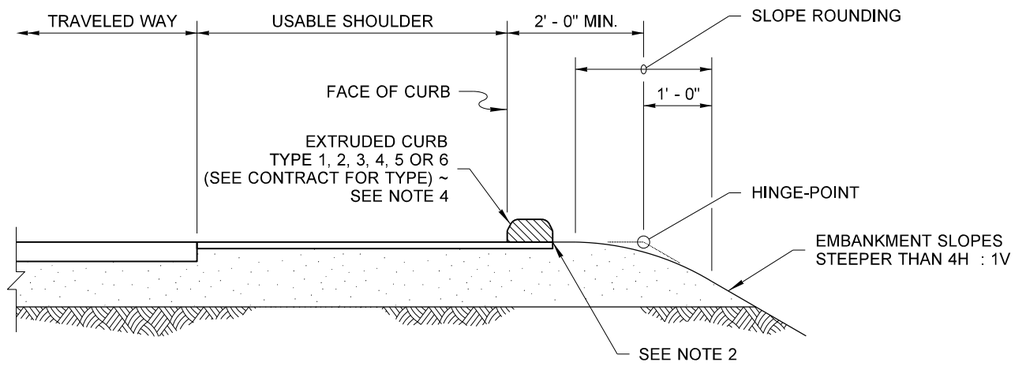
STANDARD PLAN C-25.30-00

SHEET 1 OF 1 SHEET

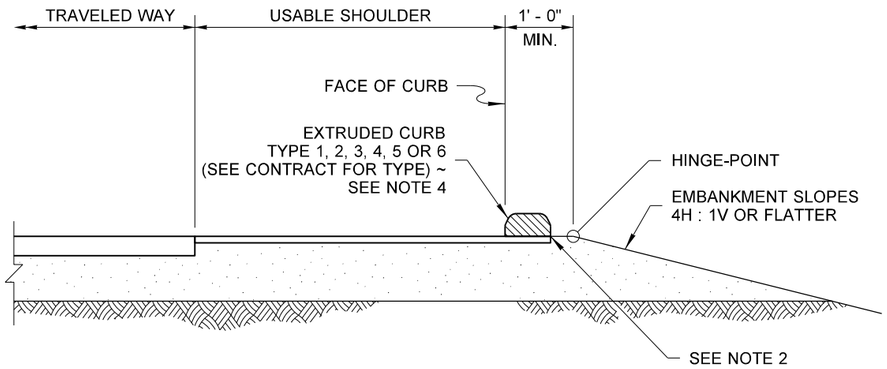
APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER

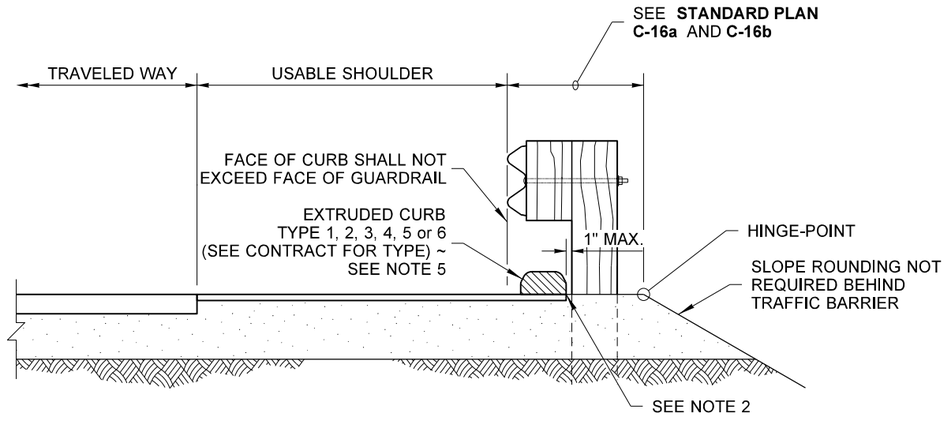
Washington State Department of Transportation



EXTRUDED CURB WITH SLOPE ROUNDING



EXTRUDED CURB WITHOUT SLOPE ROUNDING



EXTRUDED CURB AT BEAM GUARDRAIL

NOTES

1. The installation of curb in areas with existing guardrail could require the removal and resetting of the guardrail or its components.
2. Extend shoulder pavement to provide a base for the extruded curb.
3. See Contract for exception to distances shown.
4. Type 3 and 6 curbs are not used on roadways with a posted speed greater than 40 mph.
5. Type 3 and 6 are not used under beam guardrail on roadways with a posted speed greater than 50 mph.
6. For extruded curb placement at Beam Guardrail Type 31, See **Standard Plan C-20.10.**
7. For extruded curb details, See **Standard Plan F-10.42.**

DRAWN BY: FERN LIDDELL

R. SCOTT ZELLER
STATE OF WASHINGTON
28680
REGISTERED
PROFESSIONAL ENGINEER

EXTRUDED CURB PLACEMENT

STANDARD PLAN F-10.40-03

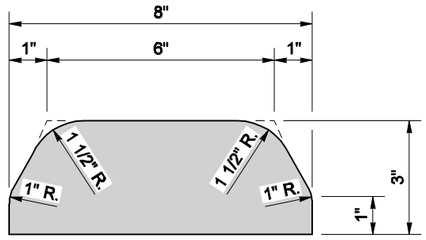
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

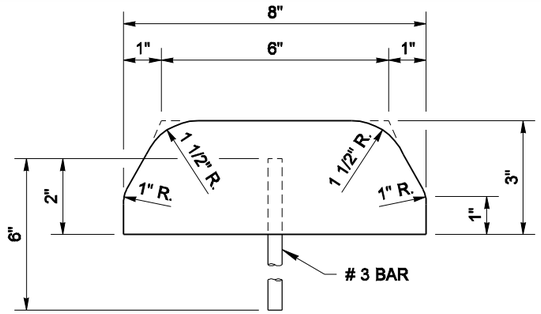
STATE DESIGN ENGINEER

Washington State Department of Transportation

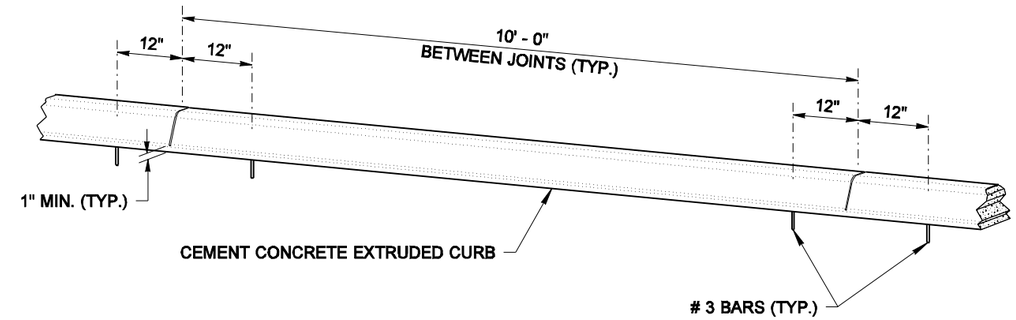
DRAWN BY: BILL BERENS



TYPE 1
(HOT MIX ASPHALT)



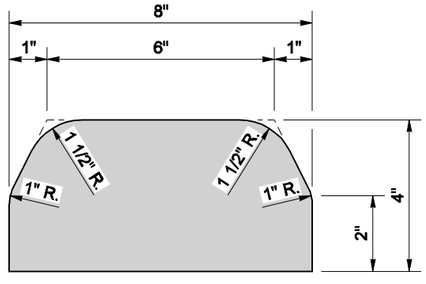
TYPE 4
(CEMENT CONCRETE)



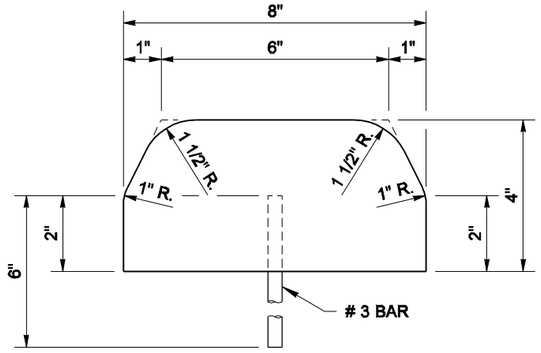
SPACING OF ANCHOR BARS
(FOR TYPES 4, 5, AND 6)

NOTE

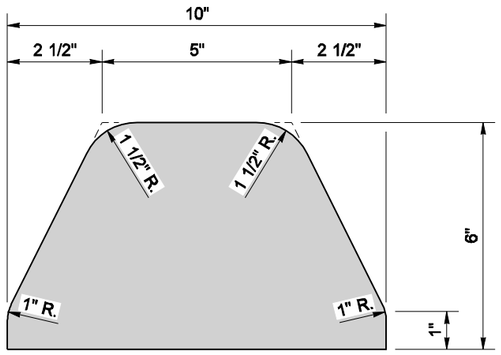
JOINTS MAY BE FORMED DURING INSTALLATION USING A RIGID DIVIDER OR SAWCUT AFTER CONCRETE CURES TO MINIMUM STRENGTH.



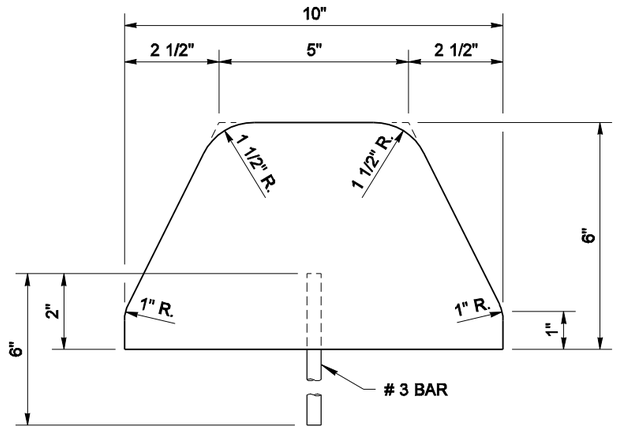
TYPE 2
(HOT MIX ASPHALT)



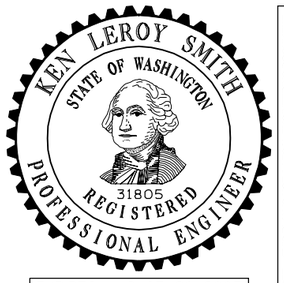
TYPE 5
(CEMENT CONCRETE)



TYPE 3
(HOT MIX ASPHALT)



TYPE 6
(CEMENT CONCRETE)



EXPIRES AUGUST 26, 2007

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

EXTRUDED CURB

STANDARD PLAN F-10.42-00

SHEET 1 OF 1 SHEET

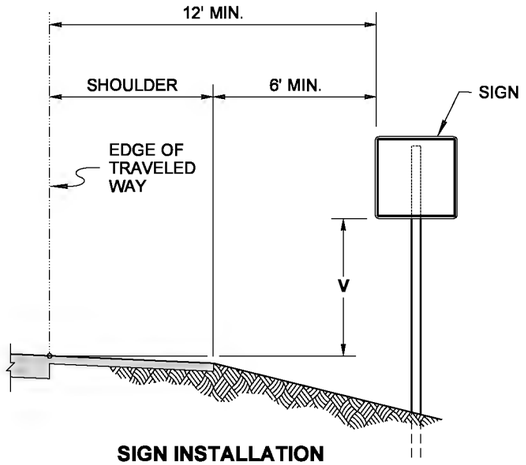
APPROVED FOR PUBLICATION

Ken L. Smith — STATE DESIGN ENGINEER

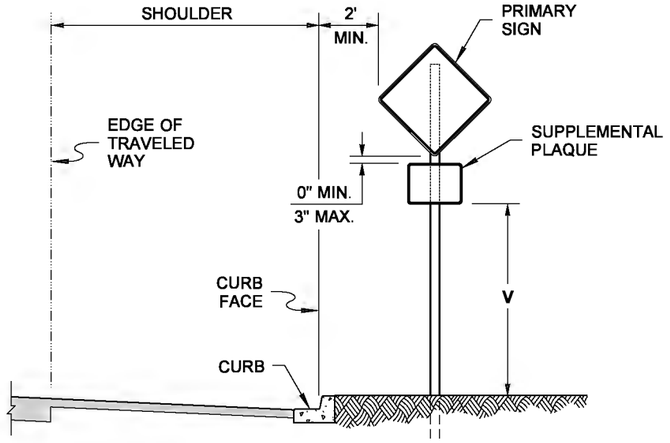
01-23-07 — DATE

Washington State Department of Transportation

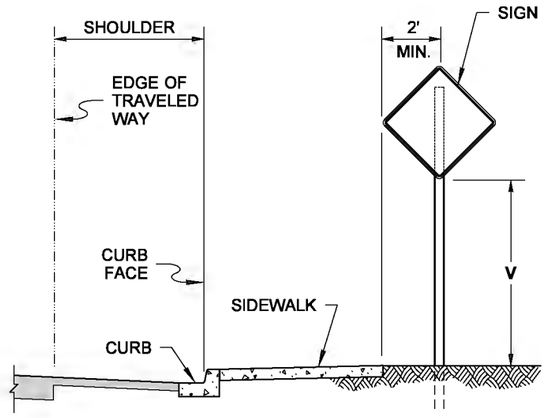
DRAWN BY: FERN LIDDELL



SIGN INSTALLATION (FILL SECTION)



SIGN INSTALLATION (CURB SECTION)

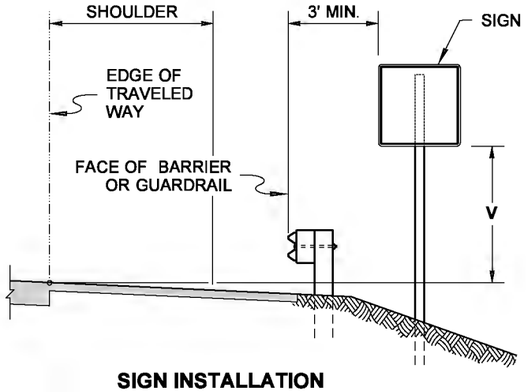


SIGN INSTALLATION (SIDEWALK AND CURB SECTION)

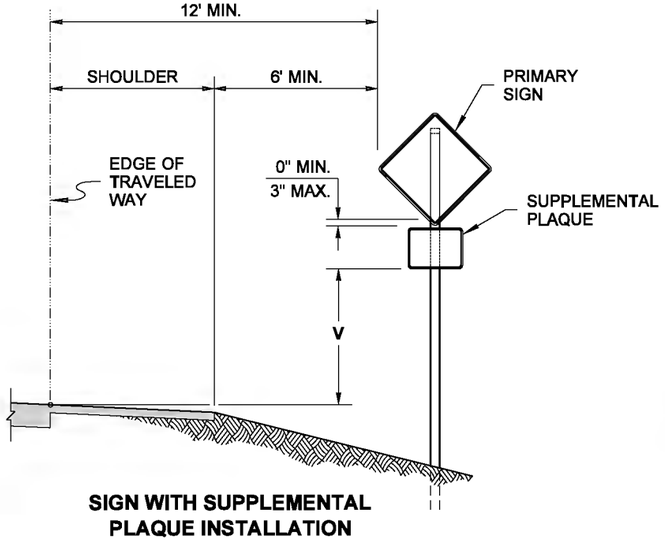
NOTES

1. For sign installation details, see **Standard Plan G - series.**
2. Where it is impractical to locate a sign with the lateral offset, a minimum of 2'(ft) offset may be used. A 1'(ft) lateral offset may be used in business, commercial or residential areas.
3. The "**V**" height for signs, with an area of more than 50 square feet and two or more sign supports, is 7 feet in both rural and urban areas.

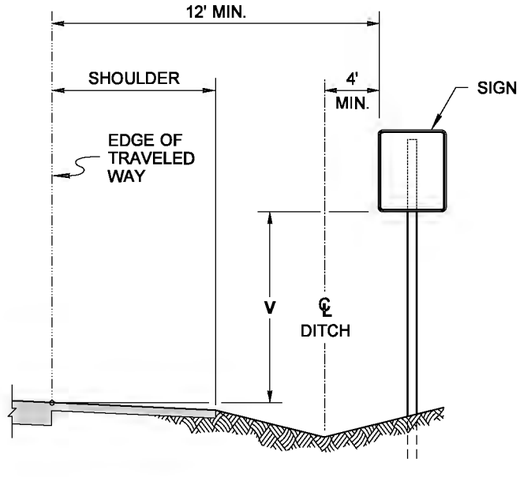
HEIGHT V		
	TO BOTTOM OF SIGN (NO SUPPLEMENTAL PLAQUE)	**TO BOTTOM OF SUPPLEMENTAL PLAQUE** (WHEN REQUIRED)
RURAL	5' MINIMUM	4' MINIMUM
URBAN	7' MINIMUM	6' MINIMUM



SIGN INSTALLATION (BEHIND TRAFFIC BARRIER)



SIGN WITH SUPPLEMENTAL PLAQUE INSTALLATION (FILL SECTION)



SIGN INSTALLATION (DITCH SECTION)

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

CLASS A CONSTRUCTION SIGNING INSTALLATION
STANDARD PLAN K-80.10-01

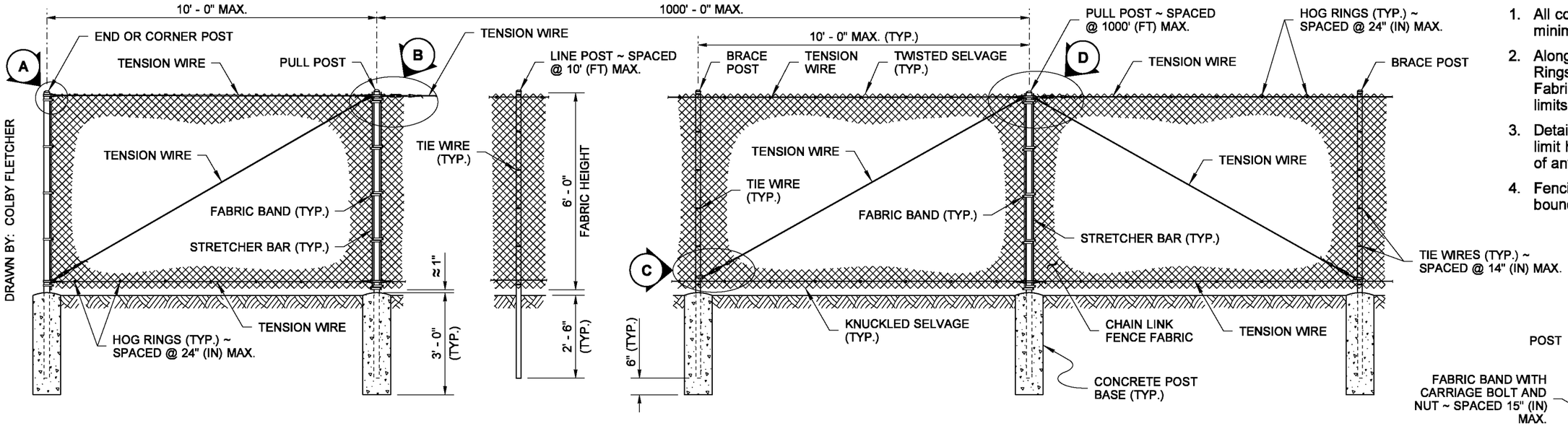
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

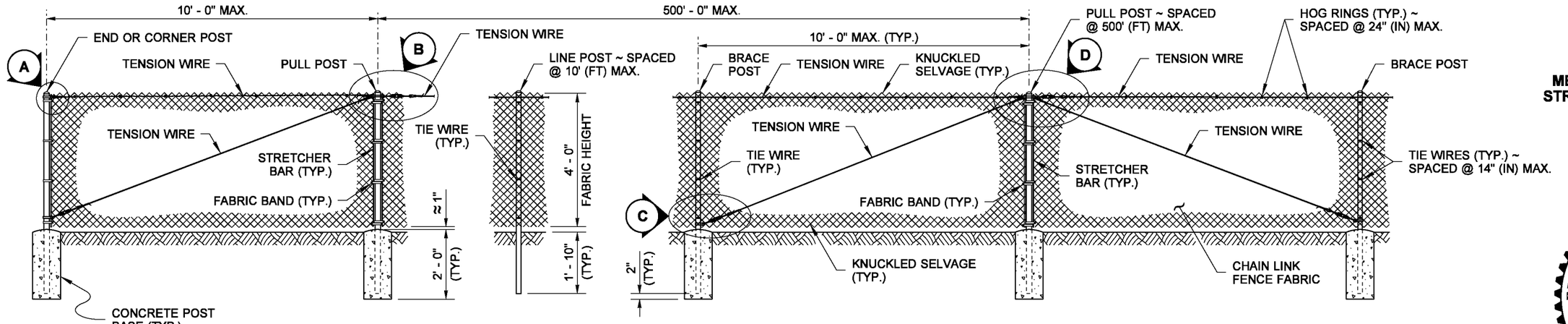
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: COLBY FLETCHER

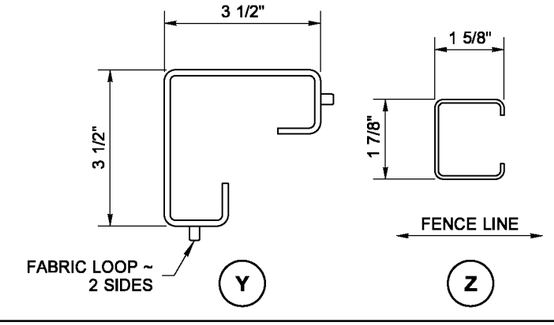


TYPE 3



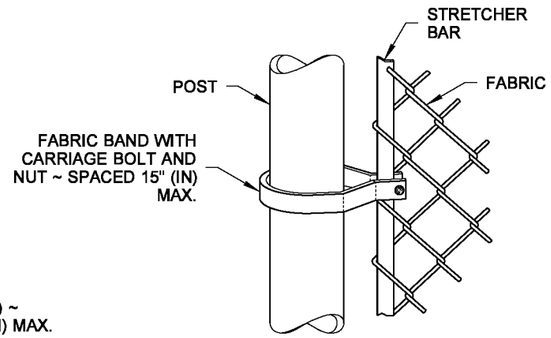
TYPE 4

POST AND RAIL SPECIFICATIONS			
POST	PIPE	ROLL FORMED	
	NOM. SIZE (SCH. 40) I.D.	SECTION	WEIGHT (lb/ft)
END, CORNER, OR PULL POST	2 1/2" DIAM.	Y	5.10
LINE OR BRACE POST	2" DIAM.	Z	1.85



NOTES

1. All concrete post bases shall be 10" (in) minimum diameter.
2. Along the top and bottom, using Hog Rings, fasten the Chain Link Fence Fabric to the Tension Wire within the limits of the first full fabric weave.
3. Details are illustrative and shall not limit hardware design or post selection of any particular fence type.
4. Fencing shall be used for security and boundary delineation only.



METHOD OF FASTENING STRETCHER BAR TO POST

EDWARD PATRICK BARRY
STATE OF WASHINGTON
34363
REGISTERED
PROFESSIONAL ENGINEER

CHAIN LINK FENCE TYPES 3 AND 4

STANDARD PLAN L-20.10-03

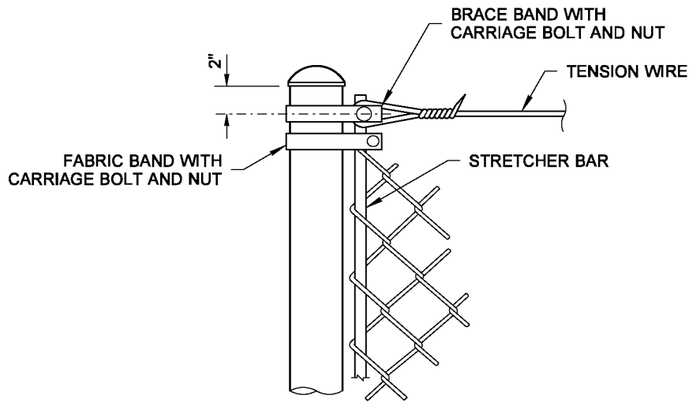
SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER

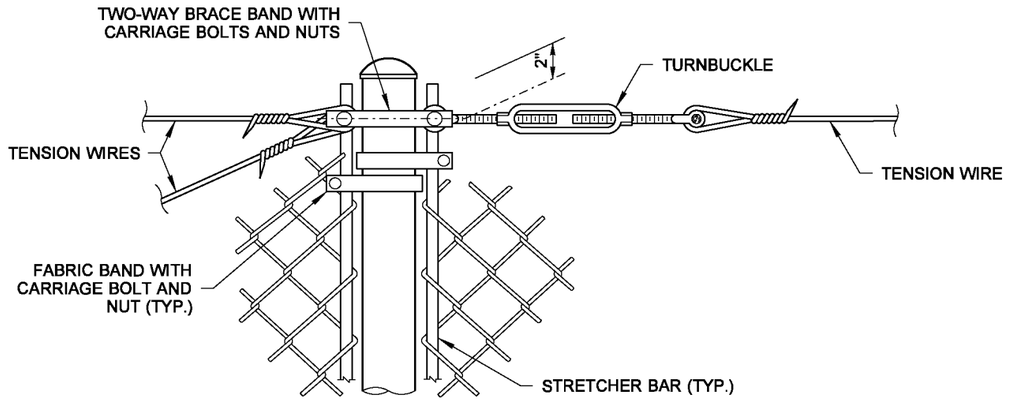
Washington State Department of Transportation

DRAWN BY: COLBY FLETCHER



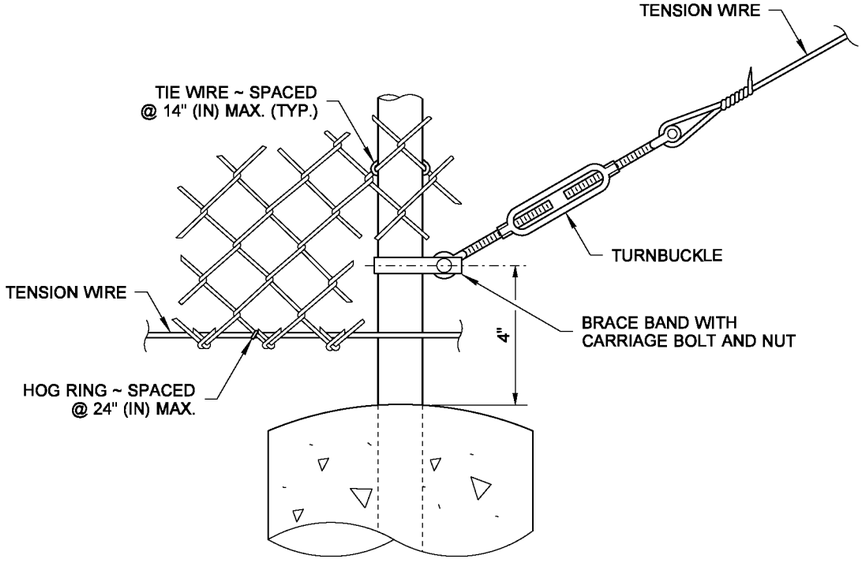
END OR CORNER POST

DETAIL (A)



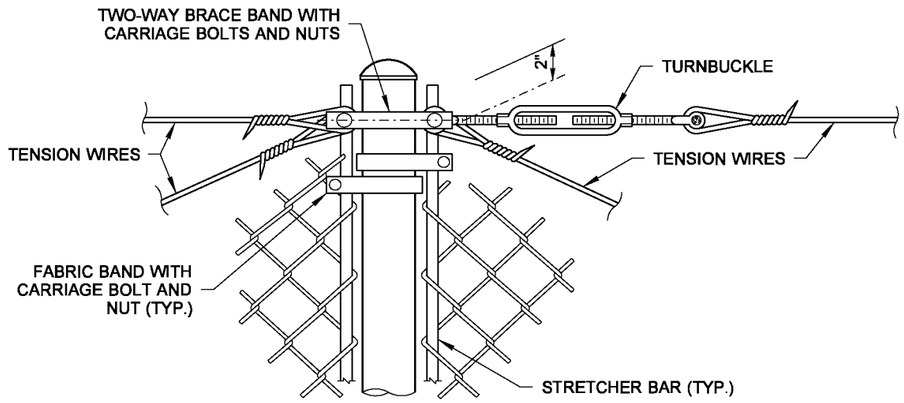
PULL POST (AT END OR CORNER)

DETAIL (B)



BRACE POST

DETAIL (C)



PULL POST (WITHIN RUN)

DETAIL (D)

EDWARD PATRICK BARRY
STATE OF WASHINGTON
34363
REGISTERED
PROFESSIONAL ENGINEER

CHAIN LINK FENCE TYPES 3 AND 4

STANDARD PLAN L-20.10-03

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

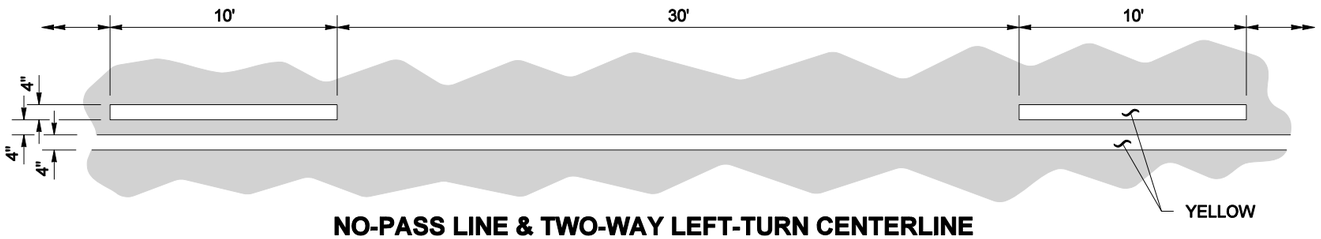
STATE DESIGN ENGINEER

Washington State Department of Transportation

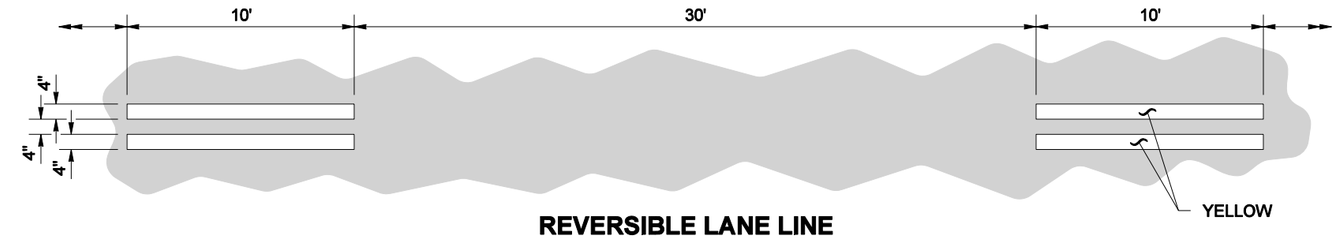
DRAWN BY: LISA CYFORD



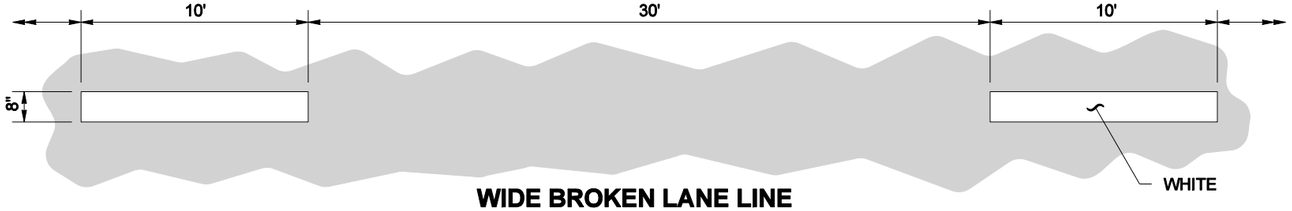
CENTERLINE & LANE LINE



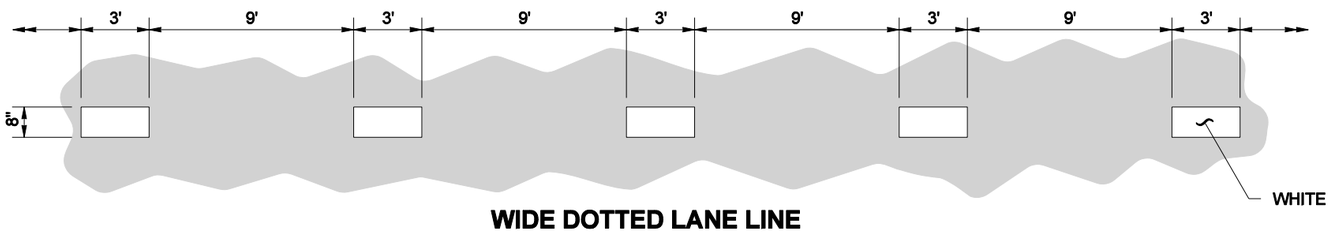
NO-PASS LINE & TWO-WAY LEFT-TURN CENTERLINE



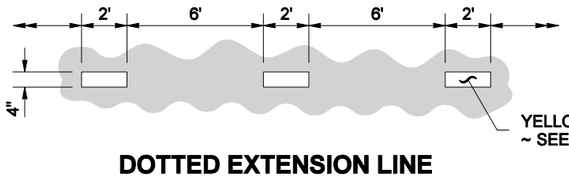
REVERSIBLE LANE LINE



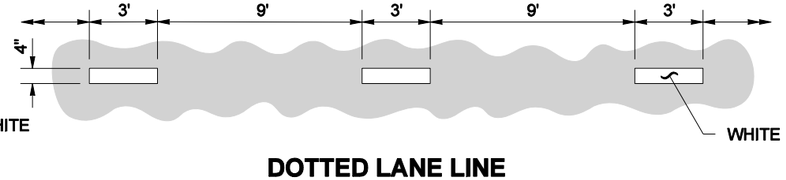
WIDE BROKEN LANE LINE



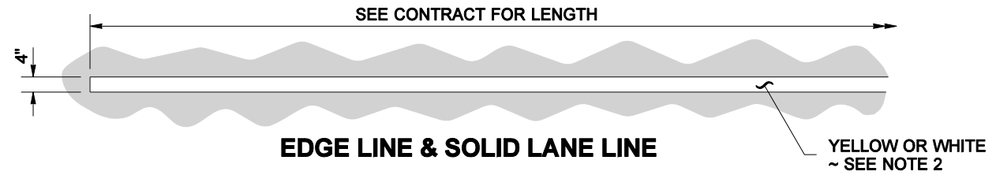
WIDE DOTTED LANE LINE



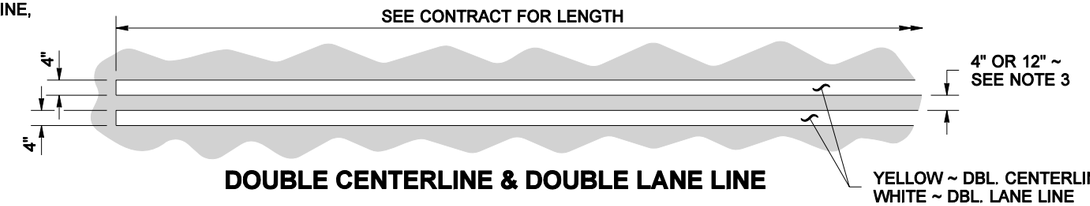
DOTTED EXTENSION LINE



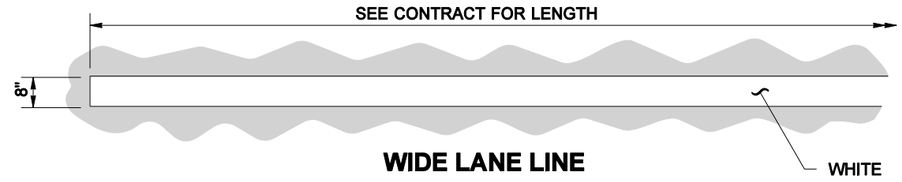
DOTTED LANE LINE



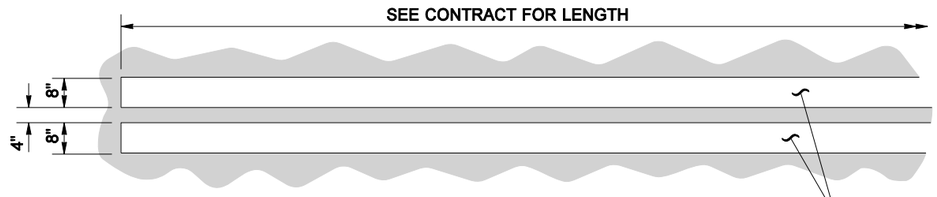
EDGE LINE & SOLID LANE LINE



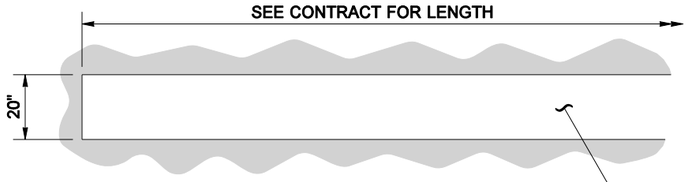
DOUBLE CENTERLINE & DOUBLE LANE LINE



WIDE LANE LINE



DOUBLE WIDE LANE LINE

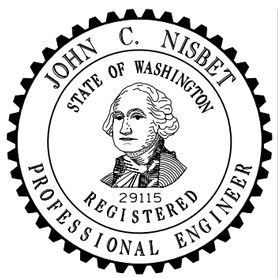


BARRIER CENTERLINE

NOTES

1. Dotted Extension Line shall be the same color as the line it is extending.
2. Edge Line shall be white on the right edge of traveled way, and yellow on the left edge of traveled way (on one-way roadways). Solid Lane Line shall be white.
3. The distance between the lines of the Double Centerline shall be 12" everywhere, except 4" for left-turn channelization and narrow roadways with lane widths of 10 feet or less. Local Agencies (on non-state routes) may specify a 4" distance for all locations.

   The distance between the lines of the Double Lane Line shall be 4".



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LONGITUDINAL MARKING PATTERNS

STANDARD PLAN M-20.10-02

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Pasco Bakotich III — STATE DESIGN ENGINEER — *06-03-11* — DATE

Washington State Department of Transportation